JVC

SERVICE MANUAL

STEREO CASSETTE DECK

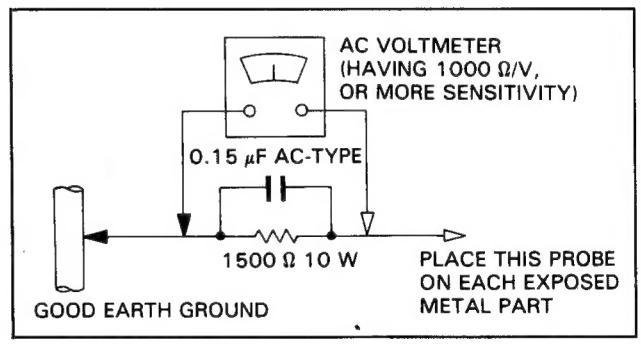
MODEL DD-VR77 A/B/C/E/G/J/U

Contents

No. 4242
December 1984

Safety Precautions

1. The design of this product contains special hardware. Many circuits and components specially for safety purposes.
   For continued protection, no changes should be made to the original design unless authorized in writing by the manufacturer. Repacement parts must be identical to those used in the original circuits. Service should be performed by qualified personnel only.
2. Alterations of the design or circuitry of the product should not be made. Any design alterations or additions will void the manufacturer's warranty and will further relieve the manufacturer of responsibility for personal injury or property damage resulting therefrom.
3. Many electrical and mechanical parts in the product have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in the parts list of Service manual. Electrical components having such features are identified by (⚠) on the schematics and parts list in Service manual. The use of a substitute replacement which does not have the same safety characteristics as the recommended replacement part shown in the parts list in Service manual may create shock, fire, or other hazards.
4. The leads in the products are routed and dressed with ties, clamps, tubings, barriers and/or the like to be separated from live parts, high temperature part, moving parts and/or sharp edges for the prevention of electric shock and fire hazard.
   When service is required, the original lead routing and dress should be observed, and they should be confirmed to be returned to normal, after re-assembling.
5. Leakage current check
   (Safety for electrical shock hazard)
   After re-assembling the product, always perform an isolation check on the exposed metal parts of the Products (antenna terminals, knobs, metal cabinet, screw heads, earphone jack, control shafts, etc.) to be sure the product is safe to operate without danger of electrical shock.
   Do not use a line isolation transformer during this check.
   - Plug the AC line cord directly into the AC outlet. Using a "Leakage Current Tester", measure the leakage current from each exposed metal part of the cabinet, particularly any exposed metal part having a return path to the chassis, to a known good earth ground (water pipe, etc.). Any leakage current must not exceed 0.5 mA AC (r.m.s.).
   - Alternate check method.
     Plug the AC line cord directly into the AC outlet. Use an AC voltmeter having 1,000 ohms per volt or more sensitivity in the following manner. Connect a 1500 Ω 10 W resistor paralleled by a 0.15 μF AC-type capacitor between an exposed metal part and a known good earth ground (water pipe, etc.)
     Measure the AC voltage across the resistor with the AC voltmeter.
     Move the resistor connection to each exposed metal part, particularly any exposed metal part having a return path to the chassis, and measure the AC voltage across the resistor. Now, reverse the plug in the AC outlet and repeat each measurement. Any voltage measured must not exceed 0.75 V AC (r.m.s.).
     This corresponds to 0.5 mA AC (r.m.s.).



Features

1. **FLIP REVERSE SYSTEM**
   - Rotary head reverse system with 3-piece diecast head assembly that assures the head axis in the best position in the forward or reverse direction.
   - Jewel lock mechanism enables superb quality of head for longer service life.
   - Quick reverse mechanism using infrared sensor.
2. **MULTI EDITOR functions for many ways of the tape edition.**
   - Auto fade-in/out.
   - EDIT CONTROL for easily detecting the tape position; **forth/back** playback is possible at normal or half speed.
   - Editing fade and editing cut for unnecessary sections of the recorded tape.
3. **Full logic mechanism with pulse-servo DD (Direct-Drive) motor**
   - 3-motor system: FG pulse-servo DD motor for the capstan and DC motors for the reels and mechanical drives.
   - Silent mechanism.
4. **Ceramic-clad SA head for recording/playback**
5. **Direct-coupled DC amplifier**
6. **DOLBY* B-C NR (Noise Reduction) system**
   - MPX (multiplex) filter switch provided.
7. **4-way digital counter**
   - Tape remaining time is displayed in either direction.
   - Music scan mechanism permits tunes to be skipped up to 20 selections.
     "Under license of Staar S.A., Brussels, Belgium."
   - Can serve as a stopwatch, showing the elapsed time in recording and playback.
   - Normally serves as a 4-digit tape counter with 2-point memory for block repeat.
8. **Microcomputer-controlled mechanisms**
   - Auto record muting
   - Index scan and blank search
   - Blank skip
   - Mechanism mode indicators
9. **2-color FL peak level meter with digital peak indicator**
   - Peak hold facility.
10. **Timer start mechanism (with safety lock)**
11. **Remote control jack provided**
12. **Auto tape select mechanism**

* Noise reduction system manufactured under license from DOLBY Laboratories Licensing Corporation.
* "DOLBY" and the double-D symbol are trademarks of DOLBY Laboratories Licensing Corporation.

Specifications

Type	: Stereo cassette deck
Track system	: 4-track, 2-channel
Tape speed	: 1-7/8 inch/sec (4.8 cm/sec)
Frequency response	: (−20 dB recording) Metal tape: 20−17,000 Hz (±3 dB) CrO_2 tape: 20−17,000 Hz (±3 dB) Normal tape: 20−16,000 Hz (±3 dB) (0 dB recording) Metal tape: 20−12,500 Hz (±3 dB) CrO_2 tape: 20−8,000 Hz (±3 dB) Normal tape: 20−8,000 Hz (±3 dB)
S/N ratio	: 58 dB (S=1 kHz, K3=3%, N=A-weighted, Metal tape) The S/N is improved by about 15 dB at 500 Hz and by max. 20 dB at 1 kHz~10 kHz with DOLBY C NR on and improved by 5 dB at 1 kHz and by 10 dB at above 5 kHz with DOLBY B NR on.
Improvement of MOL	: 4 dB at 10kHz with DOLBY C NR on.
Wow and flutter	: 0.035% (WRMS)
(Forward direction)	0.08% (DIN 45 500)
Crosstalk	: 65 dB (1 kHz)
Harmonic distortion	: K3; 0.5% THD; 1.0% (Metal tape, 1 kHz 0 VU)
Channel separation	: 40 dB (1 kHz)
Heads	: Ceramic-clad SA head for record/playback × 1 2-Gap ferrite head for erasing × 2
Motor	: Pulse Servo DD Motor (for Capstan) × 1 DC Motor (for Reel) × 1 DC Motor (for Mechanical drive) × 1
Fast wind time	: Approx. 90 sec. with C-60 cassette
Input terminals	:
Input jack × 2	; Min. input level; 80 mV Input impedance; 80 kΩ
Output terminals	:
Output jack × 2	; Output level; 0−500 mV Output impedance; 5 kΩ
Phones jack × 1	; Output level; 0−0.6 mW/8 Ω Matching impedance; 8 Ω−1 kΩ
Other terminal	: Remote control × 1
Power requirement	: AC 240/220/120 V, 50/60 Hz
Power consumption	: 27 W
Dimensions	: 17-1/8″ (435 mm) W 4-3/8″ (110 mm) H 11-1/8″ (282 mm) D (with feet, buttons, switches)
Weight	: Approx. 11.4 lbs (5.2 kg)
Accessory	: Pin cord 2

Specifications are based on DIN 45 500.
Design and specifications subject to change without notice.

Location of Main Parts

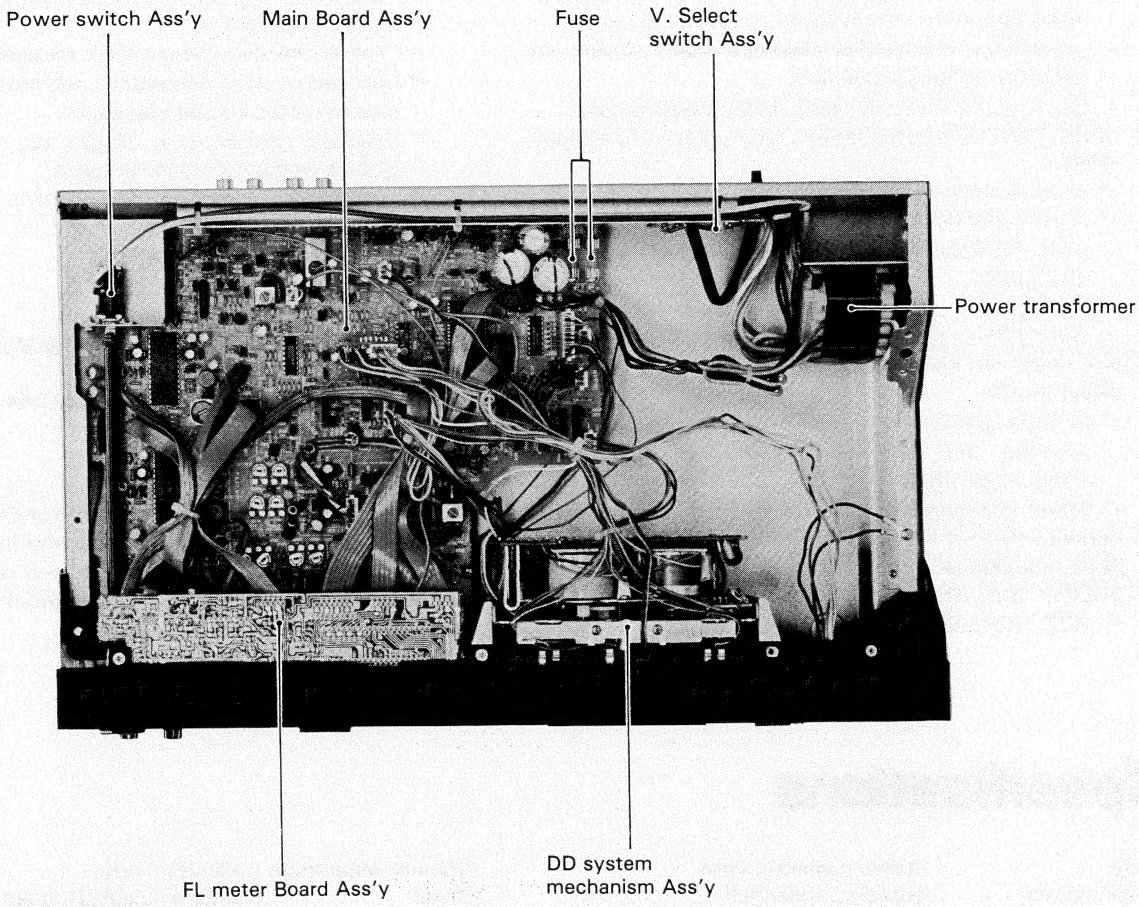


Fig. 1

Name of Control and Their Function

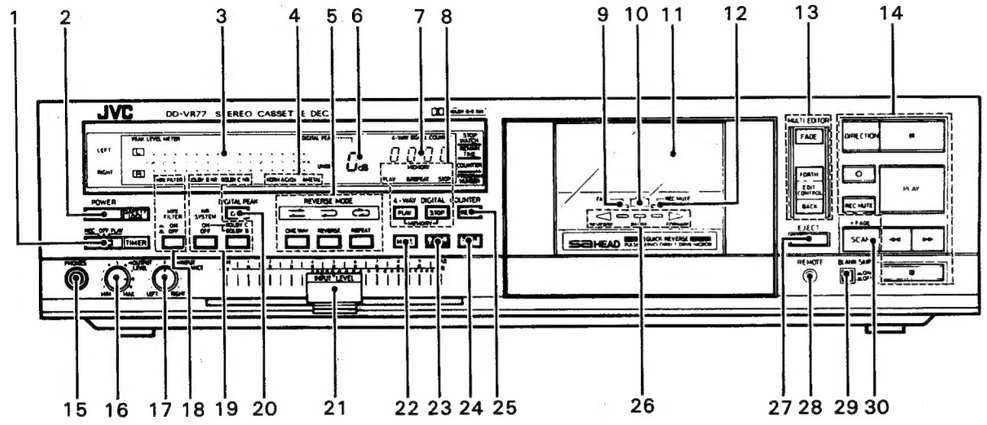


Fig. 2

1. **TIMER switch**
   Set to REC or PLAY for timer recording or timer playback using an audio timer. In other cases, be sure to set to OFF.
2. **POWER switch**
3. **PEAK LEVEL METER**
   This indicates the record input level when recording and recorded signal level on the tape when playing back. This meter holds the peak level about 2 seconds.
4. **TAPE indicators (NORM/CrO_2/METAL)**
   On of the three indicators lights by automatically deteching the type of tape used.
5. **REVERSE MODE switches and indicators**
   Select a single or full record/playback mode, or continuous play mode.
   - **REPEAT:** To play continuously sides A and B.
   - **REVERSE:** To fully play or record sides A and B.
   - **ONE WAY:** For a single-side recording or playback.
6. **DIGITAL PEAK indicator**
   This is interlocked with the PEAK LEVEL meters and gives a direct digital readout of the peak recording input or playback level.
7. **4-WAY DIGITAL COUNTER**
   Digitally shows the tape counter reading, tape remaining time and tape elapsed time according to the MODE button selection. When the SCAN SET button is pressed, the music scanning number is displayed prior to any other indication. When the music scan is completed, this counter automatically displays the previously set mode.
8. **MEMORY buttons and indicators**
   These buttons function to store specific counter readings in memory when they are pressed. The indicators above them will light when the buttons are pressed to show that a counter reading (a certain point on the tape) has been memorized. Press again to cancel this mode.
   Use both of these buttons to designate a section between two specific points on the tape to be played back repeatedly (block repeat).
9. **FADE indicator**
   Lights while fading is performed by pressing the FADE button.
10. **REC indicator**
    Lights during the recording and record-pause modes. Also lights during editing fade and editing cut.
11. **Cassette holder**
12. **REC MUTE indicator**
    Lights during record muting. Also lights during editing fade and editing cut.
13. **MULTI EDITOR control section**
    Use for the tape editing.
14. **Cassette operation buttons**
    DIRECTION:
    Press to change the direction of tape travel. The direction is shown by the indicator (▷ or ◁).
    (pause):
    Press to stop the tape temporarily. Press the PLAY button to cancel the pause mode. When this button is pressed simultaneously with the SCAN button, the blank search operation is preformed.
    ○ **(record):**
    Press ○ and PLAY buttons simultaneously for recording. Press the ○ and ❚❚ buttons simultaneously for record standby.
    REC MUTE:
    Press to make about a 4-second, non-recorded section between tunes during recording.
    PLAY:
    Press to start recording/playback. When this button is pressed simultaneously with the SCAN button, the index scan operation is performed.
    ◀◀ **(rewind):**
    Press to fast wind the tape from right to left. When this button is pressed simultaneously with the SCAN button, the music scan operation is performed.
    ▶▶ **(fast forward)**
    Press to fast wind the tape from left to right. When this button is pressed simultaneously with the SCAN button, the music scan operation is performed.
    ■ **(stop):**
    Press to stop the tape.
15. **Headphone jack (PHONES)**
    Connect headphones (with an impedance of 8 Ω — 1 kΩ). Adjust the volume level with the OUTPUT LEVEL control.
16. **OUTPUT LEVEL control**
    Simultaneously adjusts the output levels of the unit and at the headphone jack. This control is not related to the PEAK LEVEL METER. Turning this control has no effect on the recording level.
17. **INPUT BALANCE control**
    Adjust the balance between the left and right channels of recording input levels. The center click position is the standard position.
18. **MPX FILTER switch and indicator**
    Normally set to OFF. However, when making a Dolbyized recording of an FM broadcast, set to ON to prevent misoperation of the DOLBY NR circuit by eliminating the 19 kHz FM pilot signal. In addition, when this switch is set to ON, the indicator lights. Set to OFF when a tuner with an MPX FILTER is used. If the tuner does not have a MPX FILTER or if its filter is inadequate, the DOLBY NR circuit may malfunction, the sound quality may deteriorate and beats may be heard; in this case, set the switch ON.
19. **NR SYSTEM switches and indicators**
    The left button switches the NR SYSTEM ON or OFF. The right button switches to either the DOLBY B or C NR. When this switch is set to ON, either the DOLBY B NR or DOLBY C NR indicator lights to show the noise reduction mode selected.
20. **DIGITAL PEAK button**
    Press to call up the stored peak level. When this button is pressed again while the DIGITAL PEAK indicator is flickering, the new value is reset in the indicator and it is held in memory.
21. **INPUT LEVEL control**
    This controls the right and left channel recording input levels simultaneously. dB indications are provided between 4 and 9 for approximate level compensation of the DIGITAL PEAK indicator.
22. **MODE button**
    Select one of the positions according to desired mode of 4-way digital counter operation.
23. **TAPE LENGTH button**
    Set the digital counter to the remaining time mode first, then press the button until the corresponding tape length being used is displayed (C-60, C-90, etc.) to check the tape remaining time.
24. **SCAN SET button**
    For music scanning, press this button to set the number of tunes to be skipped. It is possible to skip up to 20 tunes.
25. **RESET button**
    Press to reset the digital counter. However, the digital counter is not reset during the remaining time operation.
26. **Mechanism mode indicators**
    When the tape starts running, the three LEDs between the direction indicators flash in sequence to show the direction of tape movement and the mode of operation as follows:
    - **Recording/Playback**
      LEDs flash in sequence at an interval of about 1 second in the direction of tape travel.
    - **Fast Forward/Rewind**
      LEDs flash rapidly in sequence in the direction of tape travel.
    - **SCAN**
      Each LED flashes twice in rapid sequence in the direction of tape travel.
    - **PAUSE**
      Only the center LED lights.
    - **Half speed playback**
      Only the center LED flashes.
    - **Normal speed playback**
      The three LEDs flash.
27. **EJECT button**
    Press to open the cassette holder.
28. **REMOTE control jack**
    Remote control of the DD-VR77 is possible with the optional remote control unit (JVC R-70E).
29. **BLANK SKIP switch**
    When a blank section continues for more than 10 sec. during the playback mode with this switch set to ON (▬), the deck enters the fast forward mode automatically till the tape reaches the beginning of the next tune from which point playback starts again.
30. **SCAN (+FADE) button**
    Press to perform music scan or auto fade-in/out for approximately 10 seconds.

Removal of Main Parts

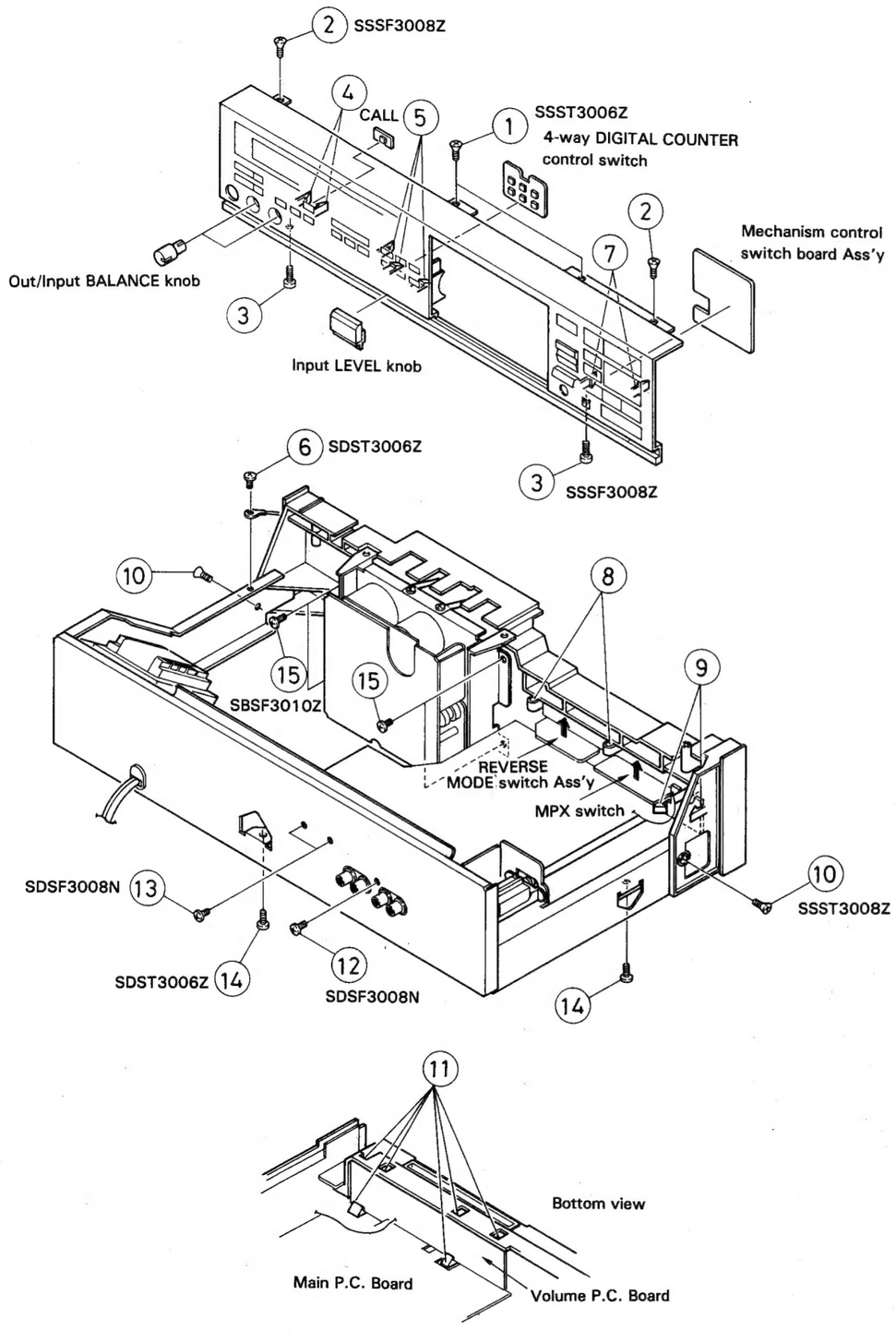


Fig. 3

Remove in Numerical Order

Refer to pages 20 and 21 for exploded view and parts list.

1. **Top Cover**
   1) Remove four screws fixing from both side.
   2) Remove two screws fixing from the rear side.
2. **Front plate Ass'y and bottom cover**
   1) Remove three screws (1) and (2) fixing the Front plate from the top side.
   2) Remove five screws, fixing the bottom cover.
   3) Remove two screws (3) fixing the Front plate from bottom side.
   4) Pull out the INPUT LEVEL knob.
   5) Pull out the two knobs (OUT/INPUT, BALANCE)
   6) Slightly pull out the Front plate, disengage pawls (4) fixing the DIGITAL PEAK (CALL) switch Ass'y.
   7) Disengage pawls (5) fixing the 4-way DIGITAL COUNTER switch Ass'y.
   8) Disconnect connector No. CN501 from the main board Ass'y. (mechanism control connector).
   9) Remove the screw (6).
3. **Mechanism control switch Ass'y and Remote jack Ass'y.**
   1) Disengage pawls (7) fixing the mechanism control switch Ass'y.
4. **Display Board Ass'y**
   For removal, pull out the Ass'y towards you.
5. **Headphone jack Ass'y**
   For removal, press this downwards.
6. **Reverse mode switch Ass'y**
   1) Disengage pawls (8) fixing the R. mode indicator Ass'y.
   2) Disengage hook, press this upwards (arrow marks)
7. **MPX, NR switch Ass'y**
   Disengage hook, press this upwards (arrow marks).
8. **Timer switch Ass'y**
   1) Pull out the T. switch knob.
   2) Disengage pawls (9) fixing the board Ass'y.
9. **Main Board and Volume Board**
   Adjustments can be made without removing the main board.
   1) To change the volume, remove screw (10), then remove the six pawls (11) fixing the volume board, and finally remove the front assembly.
   At this point, removing the timer switch board makes it easier to remove the volume board.
   2) Removing the main board
   Remove the screw (12) fixing the pin jack and the two screws (13) fixing the rectifier heat sink.
   Remove two screws (14) fixing the board. Next remove the volume assembly mentioned above.
10. **Gear damper**
    Disengage pawls fixing the damper holder.
11. **Mechanism assembly**
    (Mechanism control P.C. Board)
    Remove four screws (15) fixing to Front panel.

Removal of Mechanical Parts

1. **Pinch roller (left) (Fig. 4).**
   1) Unscrew adjusting screw ④: VKS4513-001 securing the pinch roller arm Ass'y.
   2) Pull out the pinch roller together with the torsion spring from the shaft.
2. **Pinch roller (right) (Fig. 4)**
   1) Unscrew adjusting screw ④: VKS4513-001 securing the pinch roller arm Ass'y.
   2) Pull out the pinch roller together with the torsion spring from the shaft.
3. **Replacing the head Ass'y (Fig. 4)**
   1. Remove screw ① securing the spring plate.
   2. Remove screw ③ securing the spring plate.
   3. Unscrew two screws ② holding the slide base.
   4. Remove pinch roller adjusting screws ④. (Height adjustment of the pinch roller requires fine-adjustment.)

   * Replacing the head Ass'y without removing the pinch roller.

   1. Perform procedures 1 through 3 above. (Fig. 4)
   2. Remove screws ⑤ fixing the guide lever, then remove the guide lever from the pinch roller guide. (Fig. 5)
4. **Reel disk Assemblies (Fig. 9)**
   1. Pull out reel stoppers Ⓐ and Ⓐ'.
   2. Withdraw the reel disks from the shafts.

   * Replace the reel stoppers with new ones once they have been removed.
5. **Removing the DD motor (Fig. 6)**
   Unscrew four screws ⑥ securing the DD motor.
6. **Cam motor and reel motor (Fig. 7)**
   1. Remove two screws ⑦ and five screws ⑧ securing the reel base.
   2. Unscrew four screw securing the motor. (In the case of the reel motor, disengage the belt as well.)
   3. Withdraw the motor pulley which is engaged.

   * Reassembling the cam gear (Fig. 8)

   Mesh the gears so that the marking provided on cam gear (1) is aligned with the marking on the main cam switch.

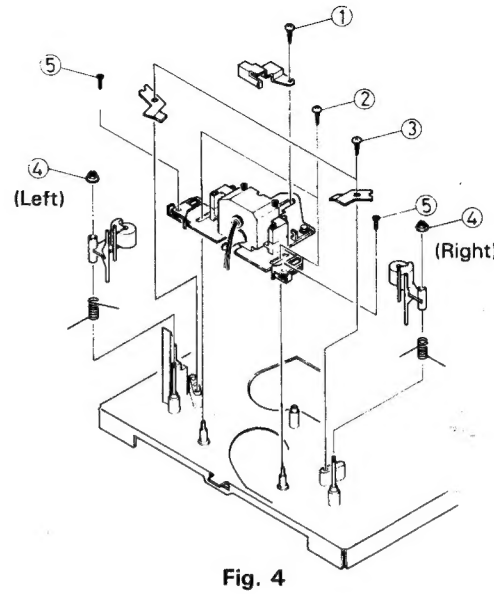


Fig. 4

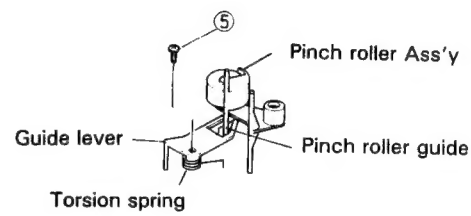


Fig. 5

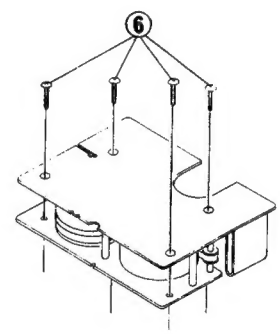


Fig. 6

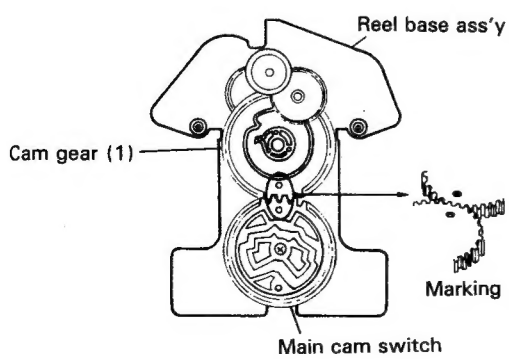


Fig. 8

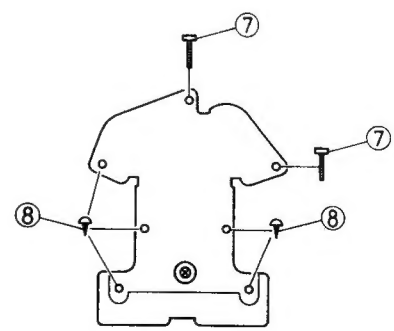


Fig. 7

Main Adjustment

[I] Equipment and Measuring Instruments used for Adjustment

1. Electrical adjustment

1) Electronic voltmeter
2) Audio frequency oscillator
   (range: 50—20 kHz and output 0 dB with impedance 600 Ω)
3) Attenuator
4) Standard tapes for REC/PB
   Maxell UD—Normal tape (TS-5)
   TDK SA—Chrome tape (TS-6)
   JVC ME—Metal tape (TS-7)
   } or equivalanet
5) Reference tapes for playback (JVC Test Tape)
   VTT702 (for head azimuth adj.)
   VTT712 (for motor speed, wow flutter adj.)
   VTT724 (for Reference Level 1 kHz) or VTT664
   TTT739 (for playback frequency response)
   TMT6447 (for music scanning)
   TMT6448 (for music scanning)
6) Resistors
   600 Ω (for attenuator matching)

2. Mechanical adjustment

1) Torque testing cassette gauge. (CTG-N)
2) Blank tape (C-120) for tape running checker.

[II] Mechanical Part of Adjustment and Replacement

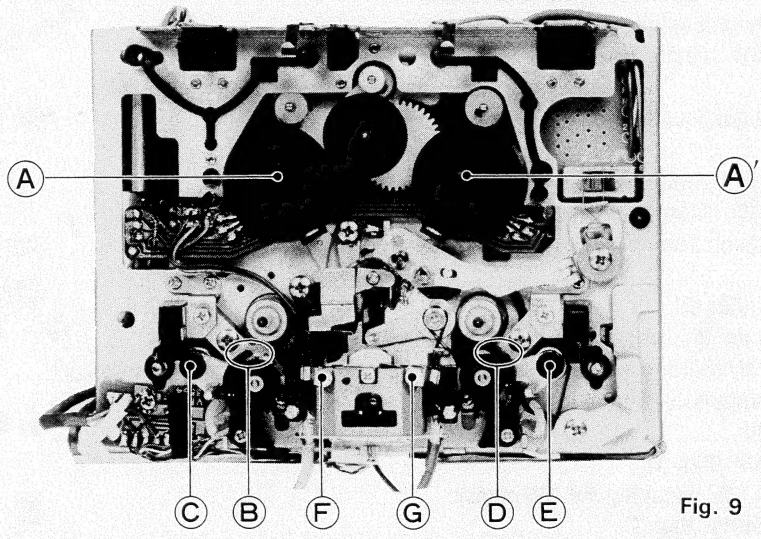


Fig. 9

Tape run adjustment

1) Put the mechanism into the PAUSE mode, then adjust the height of right and left tape guides (B) and (D) to that of the REC/PB head tape guide with adjustment screws (C) and (E).

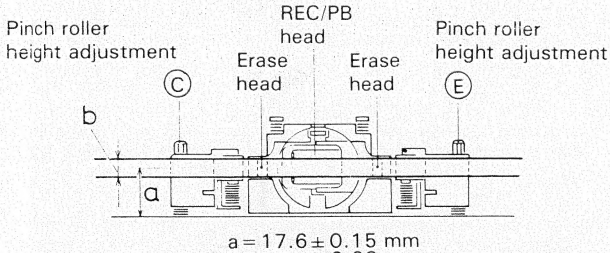


Fig. 10

2) Check the erasing cofficient of TS-7 (metal tape) by listening in the forward and reverse modes.
   — **checking method** —
   Erase the tape on which a 400 Hz or 1 kHz input of 0 VU +20 dB is recorded, then check that to sound is heard.
3) After adjustment, protect screws (C) and (E) against loosening by painting screw locking compound.

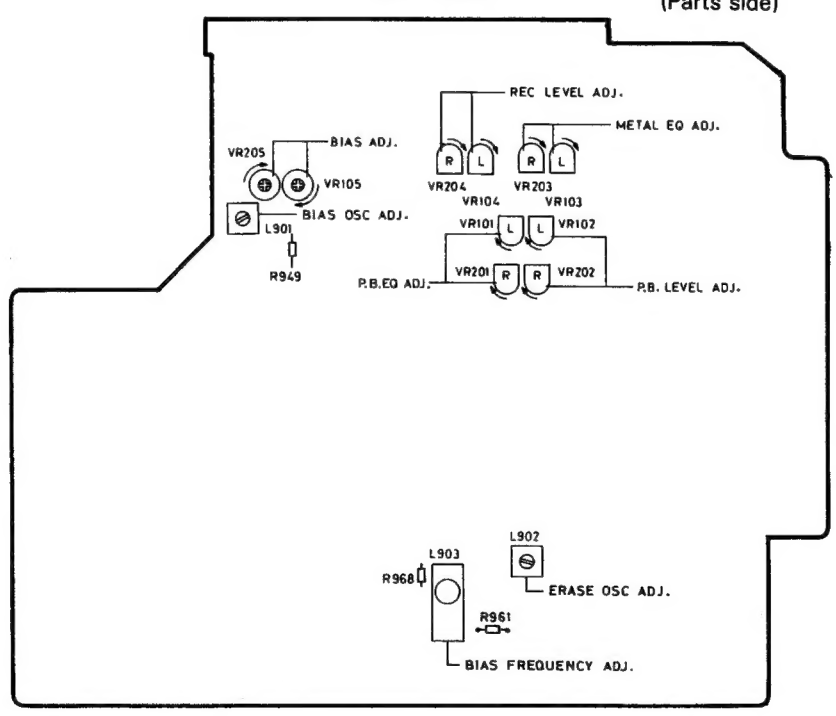
REC/PB head azimuth adjustment

1) Connect an electronic voltmeter to LINE OUT and a low frequency oscillator and an attenuator to LINE IN.
2) Forward play back VTT702 with side A towards you, then adjust screw (F) so that the output is maximized.
3) Forward record 12.5 kHz input of −20 dB on TS-5 with side A towards you, rewind it and check the output level.
4) Set side B of TS-5 towards you, reverse play back the section recorded in 3), and adjust screw (G) so that the output is maximized.
5) After adjustment, protect screws (F) and (G) against loosening by painting screw locking compound.
   — **when replacing the head** —
   In the rotary head section for auto reverse, its tilt, azimuth, height, etc. are adjusted precisely. Therefore, when the REC/PB head alone has been replaced, they must be readjusted. In this place, replace the head block.

Item	Adjustment	Adjusting point	Standard value	Remarks
Adjusting motor speed	Connect a speed meter (an electronic counter) to the LINE OUT terminals. Play back the VTT712 test tape. Adjust the semi-fixed resistor in the motor until the reading of the speedometer is 3000 Hz.	Semi-fixed resistor in the motor	3000 Hz	If the speedometer functions as a wow and flutter meter, also, connect the deck to the INPUT terminals of the meter.
Checking wow and flutter	Connect a wow and flutter meter to LINE OUT terminals. Play back the VTT712 test tape. Check to see if the reading of the meter is within 0.052% (WRMS).		0.052% (WRMS) (DIN 45500)	If the reading becomes moving value even if conforming to the standard, a reclaim may be raised. Repairs are necessary.
Checking playback torque	Employ a torque testing cassette tape (CTG-N) for the checking, or remove the cassette cover and use a torque gauge.		40—70 gr-cm	If the standard torque is not obtained, replace the take-up disc assembly.
Checking fast forward torque	Measure the torque in the fast forward mode in the same manner as in the above.		More than 80 gr-cm	
Checking rewind torque	Measure the torque in the rewind mode in the same manner as in the above.		More than 80 gr-cm	
Multi-music scan check	1. Using a TMT6447 with the counter display switch set to MMS. Push the FF SCAN or REW SCAN button to check scanning. 2. Using the TMT6448, the music scan mechanism does not function.			

Electrical Adjustment Point

Main Board (Parts side)



FL Board (Pattern side)

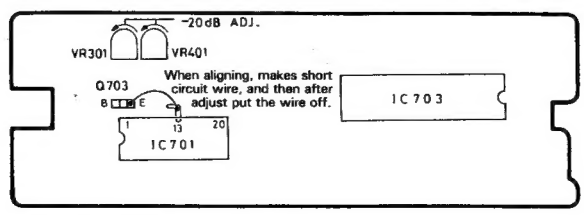


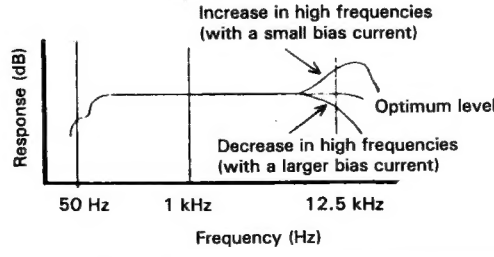
Fig. 11

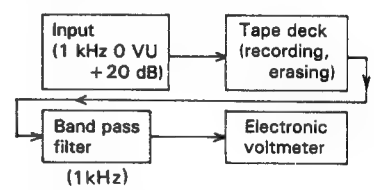
[IV] Electrical Circuit Adjustment Procedure

In the steps marked by an asterisk (*), adjustment should be performed, however, only checking is sufficient with steps other than those.
Adjustment should be performed in the order of steps 1, 2, 3, ...
Perform this adjustment with the ANRS switch set to OFF.

Step	Item	Check and Adjustment			
1	Checking DOLBY circuit (Rec mode)			Frequency Level	Output raise value, deviation value
		Signal input : LINE IN Cal. Level : 400 Hz −6 dBs Output terminal : TP101,201	DOLBY B (Rec)	1 kHz, Cal−40 dB	+5.7 dB ±1 dB
				5 kHz, Cal−20 dB	+3.5 dB ±1.5 dB
				1 kHz, Cal	0 dB ±1 dB
			DOLBY C (Rec)	1 kHz, Cal−40 dB	+17 dB ±1.5 dB
				5 kHz, Cal−20 dB	+3.5 dB ±1.5 dB
				1 kHz, Cal	0 dB ±1 dB

Step	Item	Adjustment	Adjusting point	Standard value	Remarks
2*	Adjusting playback level	1. Playback the VTT724 Reference tape (1 kHz). 2. Adjust VR102 and VR202 until the LINE OUT becomes about −4 dBs.	VR102 202	−4 dBs (0.5 V)	This adjustment becomes necessary when a change in playback level results (for example, due to head replacement).
3*	Playback freqeuncy response	Playback test tape VTT739 (1 kHz, 10 kHz) for following adjustment. 1) Adjust VR101 and VR201 so that 10 kHz signal and 1 kHz signal gains become flat response.	VR101 201	Reference frequency 1 kHz 0±0.5 dB	NR : OFF
4	Adjusting the bias frequency	Connect the 1 MΩ to the F. counter and adjust L903 so that the R968 terminal output becomes 81 kHz.	L903	81 kH± 1 kHz	
5*	Adjusting record and erase bias	Oscillate the record and erase bias (normal recording), and adjust L901 and L902 so that the R949 and R961 terminal voltage becomes minimum.	Record: L901 Erase: L902	Electric current consumption is minimal	
6*	Peak level meter	1. Short the IC701 terminal No. 13 and Q703 E (emitte) 2. Put set into Record Mode. 3. Put the output level volume to MAX. 4. Add the signal of 1 kHz to LINE IN and adjust attenuator so that LINE OUT becomes −24 dBs, then adjust VR302 and 402 so that the light goes on when the level meter shows −20 dB and goes off at an input of −25 dB. 5. Verify that at −4 dBs, the light goes on when the level meter shows 0dB. 6. Please remove the short wire.	VR302, 402	At an input of −20dB, the light goes on. At an input of −21dB, the light goes off.	
7*	Checking record/ playback frequency response	Record 1 kHz, 50 Hz and 12.5 kHz signals at an input level of 0 VU to −20 dB. Playback the recorded part. Check to see that the 50 Hz and 12.5 kHz signal output deviations fall within the standard range, using the 1 kHz signal output as a reference.	For Metal tape: VR105 205	Reference frequency; 1 kHz 0±0.5 dB at 50 Hz 0±0.5 dB at 12.5 Hz	This checking should be performed for normal, chrome and metal tapes and for both right and left channels. 1. Bias current adjustment for a cassette deck should generally be performed referring to the record/playback frequency response. This is because the frequency response of a cassette deck depends more greatly upon the bias current than does that of an open reel deck. The current measuring method described below is an alternative one. 2. If the bias current is not properly adjusted, the record and playback characteristics become as shown-below.



Step	Item	Adjustment	Adjusting point	Standard value	Remarks
8	Adjusting recording level	1. Apply a 1 kHz, approx. −10 dB signal to the LINE IN terminals. Adjust the recording level controls until the signal is available at −4 dBs at the LINE OUT terminals. 2. After checking to see if the PEAK HOLD meter become up to 0, record the signal applied to both left and right channels using normal tape. 3. Play back the recording part. Perform the recording signal adjustment with VR104 and VR204 so that the LED indicator become up to 0.	VR104 204	0 VU	The level difference between left and right channels for normal tape, chrome tape and metal tape should be less than 1 dB. Perform the adjustment using a normal tape, level difference between recording and playback for CrO_2 and metal tapes should be less than 1.5 dB, and that between left and right channels should also be less than 1 dB.
9	Checking record/ playback signal distortion	1. Record a 1 kHz, −4 dBs signal to LINE IN terminals and perform recording with the PEAK HOLD meter becomes up to 0. 2. Play back the recorded part. Check the output with a distortion meter to see if the value conforms to the standard value.		NORM tape; Less than 2.0% CrO_2 tape; Less than 3% Metal tape; Less than 2%	Be sure to perform this adjustment following bias current and recording level adjustments.
10	Checking signal to noise ratio in recording/playback	1. Record a 1 kHz, 0 dB signal. Stop the input by disconnecting from the terminal to perform nonsignal recording. 2. Play back the recorded part. Measure the 0 dB recording output and the non-signal recording output for comparison using an electronic voltmeter. Check to see if the value conforms to the standard value.		NORM, CrO_2 and Metal tapes; More than 45 dB	
11	Checking erasing coefficient	1. Apply a 1 kHz signal to the LINE IN terminals. Adjust the recording level controls until the PEAK HOLD meter lighten up to 0. 2. Perform recording with the signal enhanced by 20 dB. 3. Erase a part of the recording. 4. Measure the output difference between the erased part and nonerased part to compare with an electronic voltmeter.		More than 65 dB	For the measuring, connect a band pass filter between the deck and the elctronic voltmeter. 
12	Checking	For adjustment of the clearance between the Hall IC and magnet, check that the tape does not automatically stop at the start of FF. (This clearance should be adjusted to within 1 ± 0.5 mm)			

Standard Schematic Diagram (1) (FL. Indicator Circuit)

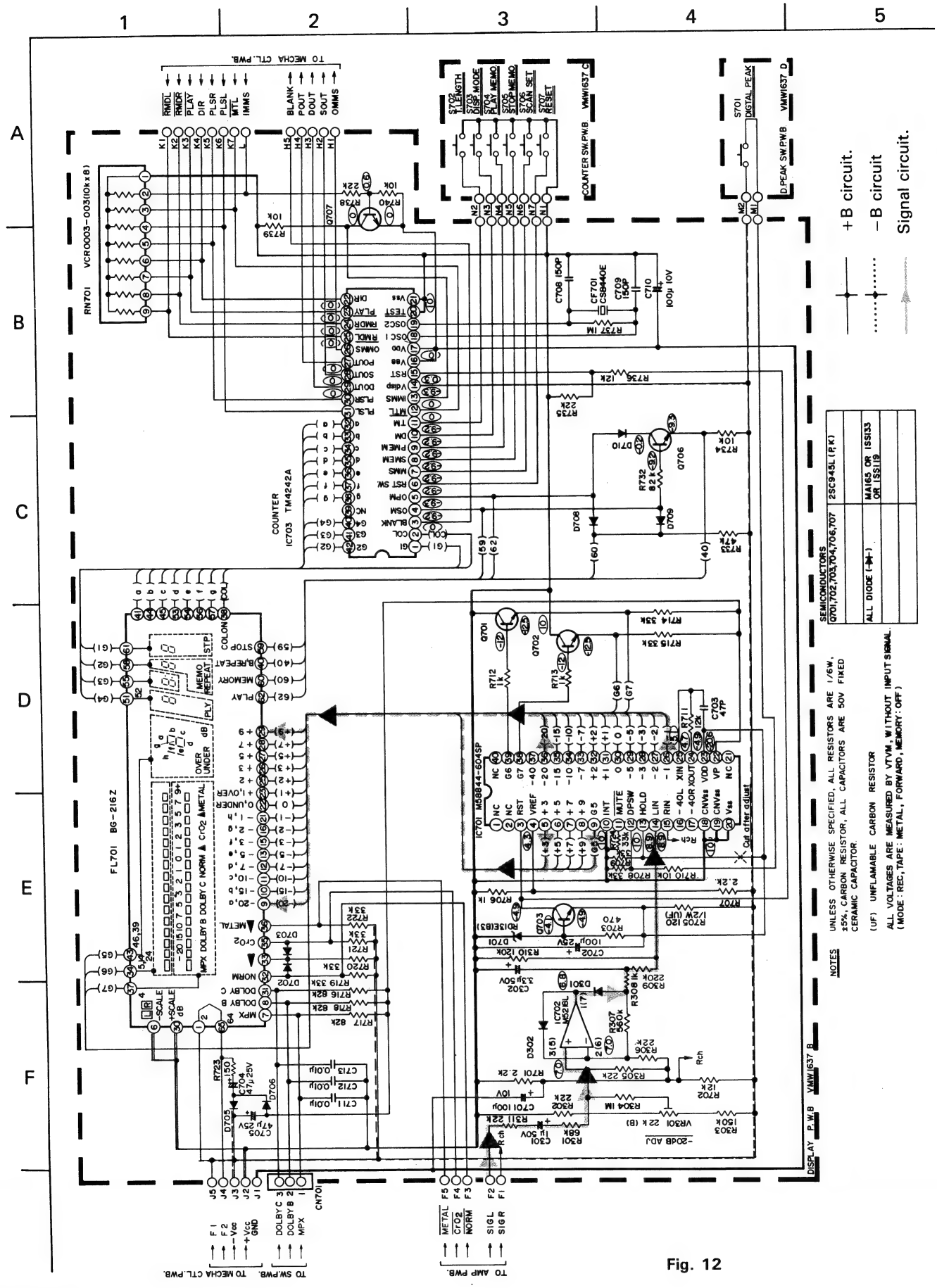


Fig. 12

Block Diagram

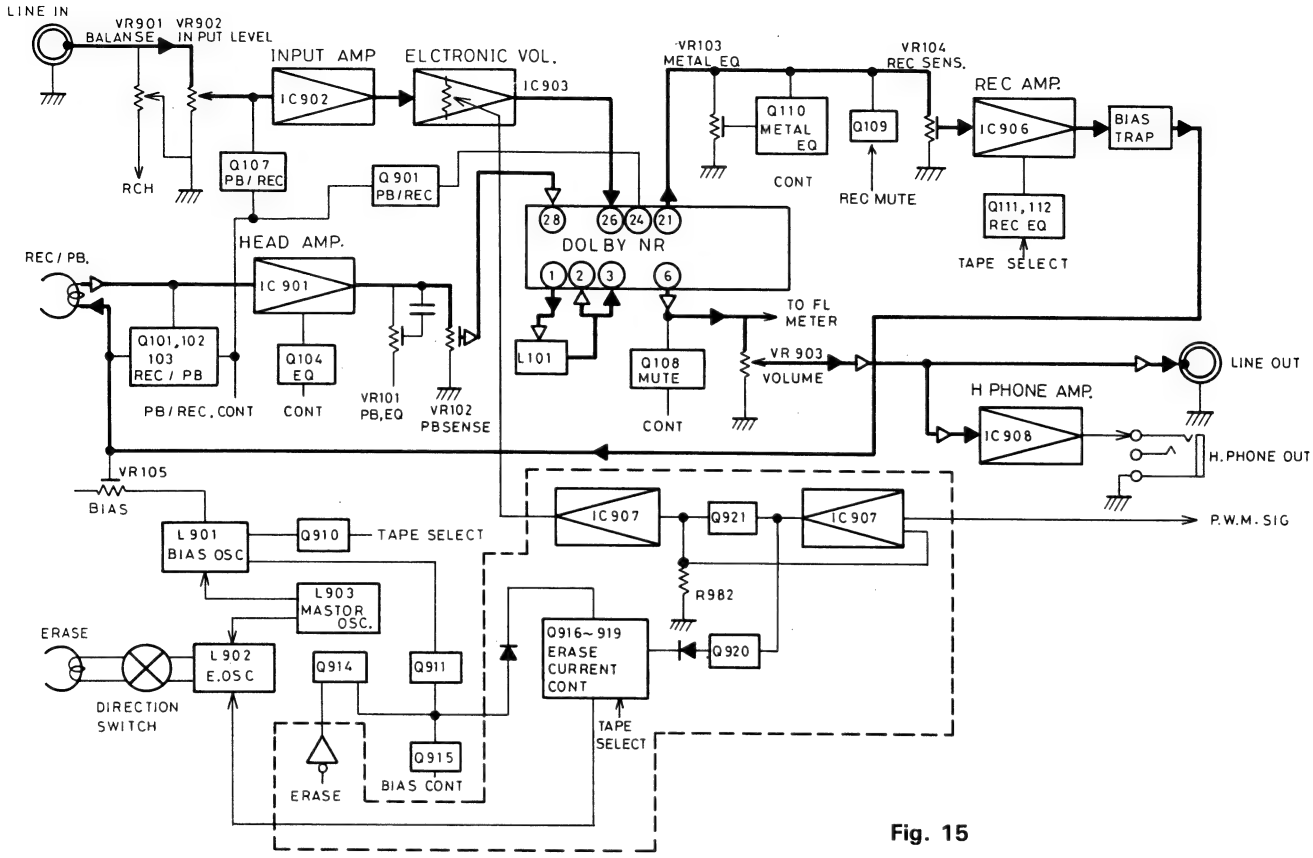
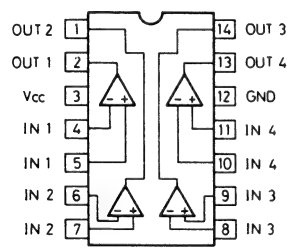


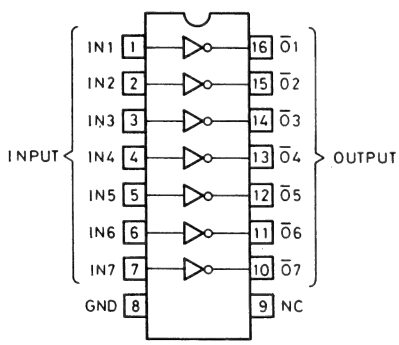
Fig. 15

Integrated Circuit

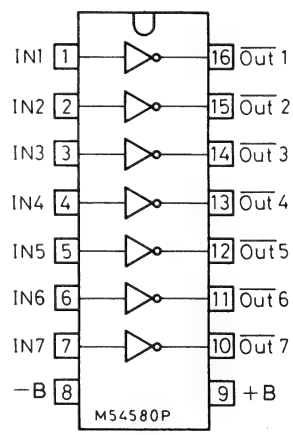
LA6339 or UPC339C



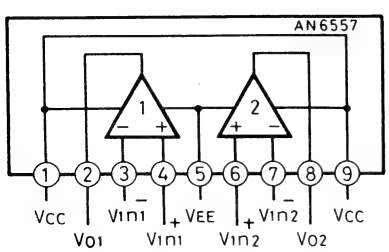
M54519P



M54580P



AN6557



LA2000S

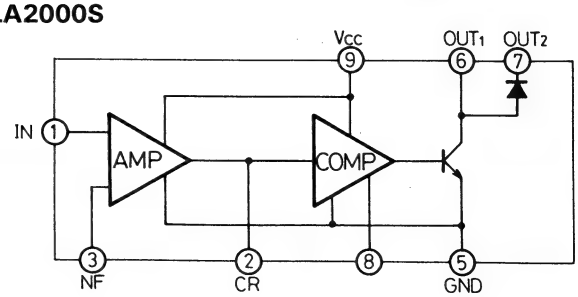


Fig. 16

Location of P.C. Board Parts List

⚠ parts are safety assurance parts. When replacing those parts, make sure to use the specified one.

⚠	REF. NO	PARTS NO.	PARTS NAME	QTY
	IC901	AN6557	I.C.	1
	IC506,IC507	BA6208A	I.C.	2
	IC508	LA2000S	I.C.	1
	IC501	LA6339	I.C.	1
	IC504,IC505	M5218L	I.C.	7
	IC702,IC902			
	IC906-IC908			
	IC903	M5222L	I.C.	1
	IC503	M54519P	I.C.	1
	IC905	M54580P	I.C.	1
	IC701	M58844-604SP	I.C.	1
	IC101,IC201	TEA0665	I.C.	2
	IC502	TMP47C46N-9111	I.C.	1
	IC703	TM4242A	I.C.	1
	Q508 ,Q519	2SA733A(P,K)	TRANSISTOR	8
	Q520 ,Q523			
	Q902 ,Q915			
⚠	Q920 ,Q921			
	Q903	2SA992(F,E,U)	TRANSISTOR	1
	Q507	2SB605(LA,KA)	TRANSISTOR	1
⚠	Q517	2SB772(Q,P)	TRANSISTOR	1
	Q908 ,Q909	2SC1685(R,S)	TRANSISTOR	4
	Q912 ,Q913			
	Q101 ,Q102	2SC1845(E,U)	TRANSISTOR	4
	Q201 ,Q202			
⚠	Q530	2SC2001(L,K)	TRANSISTOR	1
	Q103 ,Q105	2SC945L(P,K)	TRANSISTOR	42
	Q106 ,Q107			
	Q111 ,Q112			
	Q203 ,Q205			
	Q206 ,Q207			
	Q211 ,Q212			
	Q501 -Q506			
	Q509 -Q511			
	Q518 ,Q522			
	Q524 -Q526			
	Q529 ,Q701			
	Q702 ,Q703			
	Q706 ,Q707			
	Q901 ,Q904			
	Q905 ,Q907			
	Q910 ,Q911			
	Q914 ,Q916			
	Q918 ,Q919			
	Q108 ,Q109	2SD1302(RST)TA	TRANSISTOR	5
	Q208 ,Q209			
	Q917			
⚠	Q516 ,Q521	2SD882(Q,P)	TRANSISTOR	2
	Q104 ,Q204	2SJ103(GR)E2	FET	2
	Q110 ,Q210	2SK246(GR)E2	FET	4
	Q514 ,Q515			
⚠	D535	RD12E(B2)	Z.DIODE	1
	D701	RD13E(B3)	Z.DIODE	1
⚠	D533	RD5.6E(B3)	Z.DIODE	1
	D501 -D503	SLR-55URC50F124	L.E.D.	3

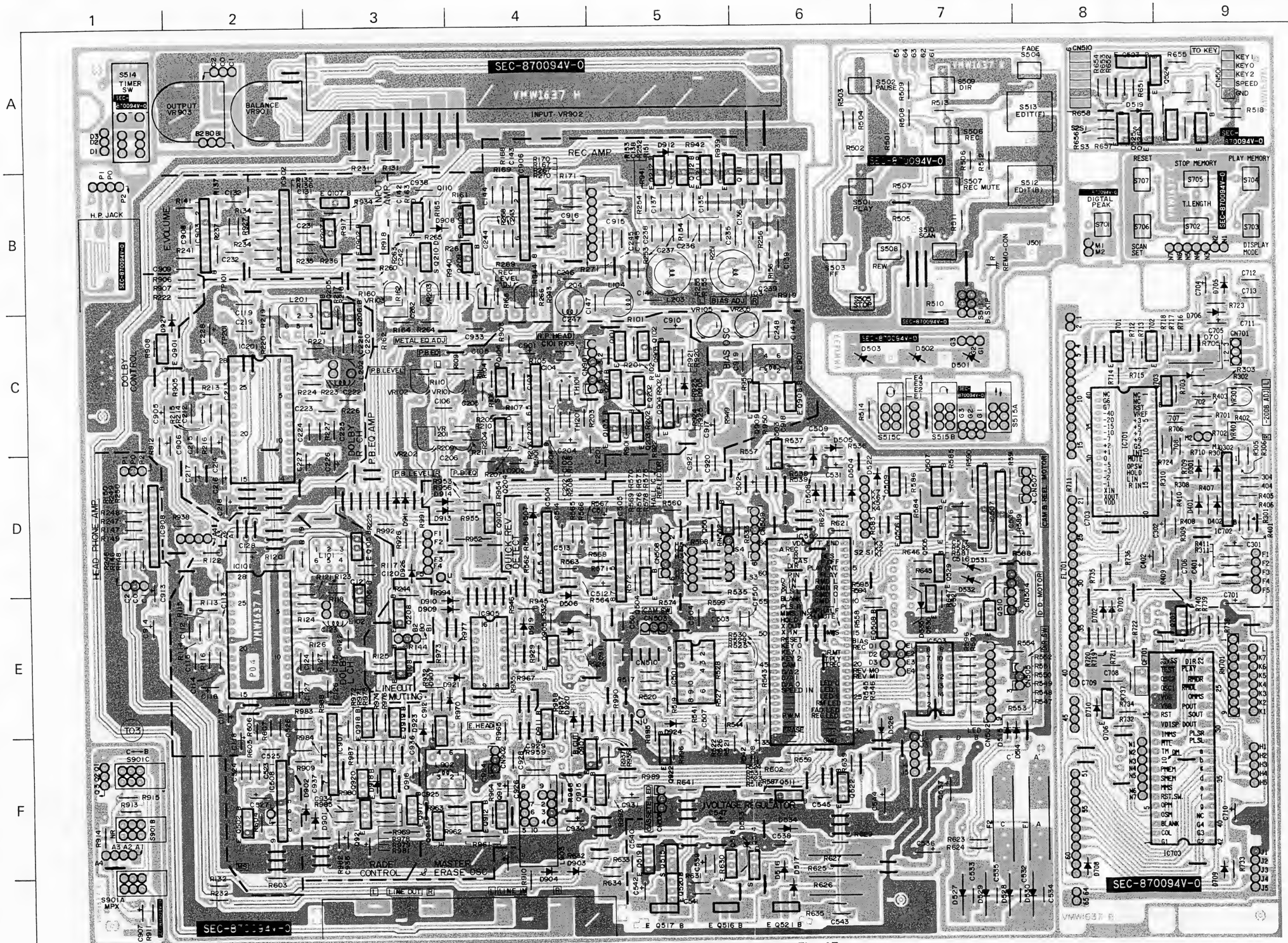
⚠	REF. NO	PARTS NO.	PARTS NAME	QTY
	D301 ,D302	1SS254T-77	SI.DIODE	42
	D401 ,D402			
	D504 -D508			
	D514 -D517			
	D519 ,D522			
	D702 ,D703			
	D705 ,D706			
	D708 -D710			
	D901 -D905			
	D907 -D914			
	D918 -D921			
	D923 ,D926			
	D927			
	D526	10E1	SI.DIODE	1
⚠	D527 -D530	10E2	SI.DIODE	4
	D531 ,D532	11E1	SI.DIODE	3
	D534			
	VR901	QVM4A7X-125	V.RESISTOR	1
	VR903	QVN6A7A-014	V.RESISTOR	1
	VR101-VR104	QVZ1802-223M	V.RESISTOR	10
	VR201-VR204			
	VR301,VR401			
	VR105,VR205	QVZ3501-473	V.RESISTOR	2
	VR902	QVZ6201-003	V.RESISTOR	1
	CN501	QMV5004-005	CONNECTOR	1
	CN510	QMV5004-006	CONNECTOR	1
	CN503-CN506	QMV5005-003	PLUG	5
	CN902			
	CN507	QMV5005-004	CONNECTOR	1
	CN508,CN509	QMV5005-006	PLUG	3
	CN901			
	CN502	QMV5005-009	CONNECTOR	1
	CN701	VMC0007-003	CONNECTOR	1
	S501 -S510	QSP0301-002	PUSH SWITCH	17
	S701 -S707			
	S512 ,S513	QSP0301-007	PUSH SWITCH	2
	S514	QSS2301-102	SLIDE SWITCH	1
	S511	QST3101-V51	PUSH SWITCH	1
	S901	QST5341-V03	PUSH SWITCH	1
	S515	QST5341-V04	PUSH SWITCH	1
	L903	VGC0015-001	MODULE	1
	L902	VQH1008-007	OSC COIL	1
	L901	VQH1008-008	OSC COIL	1
	L104 ,L204	VQP0001-183S	INDUCTOR	2
	L103 ,L203	VQP0001-332S	INDUCTOR	2
	L102 ,L202	VQZ0013-001S	FILTER	2
	L101 ,L201	VQZ0016-101	FILTER	2
	R647	QRD121J-	CARBON RESISTOR	1
	R705	QRD129J-121	C RESISTOR	1
⚠	R961	QRD149J-100S	CARBON RESISTOR	1
⚠	R952	QRD149J-101S	CARBON RESISTOR	1
	R101 -R111	QRD161J-	CARBON RESISTOR	363
	R113 -R127			
	R131 ,R132			
	R134 -R137			

⚠	REF. NO	PARTS NO.	PARTS NAME	QTY
	R141 ,R144 R146 -R156 R160 -R171 R201 -R211 R213 -R227			
	R231 ,R232 R234 -R237 R241 ,R244 R246 -R256 R260 -R271			
	R301 -R311 R401 -R411 R501 -R514 R516 -R531 R533 ,R535			
	R536 -R539 R541 -R554 R557 -R576 R578 ,R581 R582 ,R583			
	R585 -R591 R594 -R599 R602 -R607 R621 -R624 R630 -R635			
	R639 ,R641 R645 ,R646 R651 -R658 R701 -R703 R706 -R724			
	R732 -R740 R901 -R915 R917 -R929 R932 ,R934 R935 -R946			
⚠	R949 -R951 R953 -R959 R962 -R965 R967 ,R968 R970 -R985			
	R987 -R993			
⚠	R625 -R627	QRX019J-5R6	M.F.RESISTOR	3
⚠	R629	QRZ0052-101	CARBON RESISTOR	1
⚠	R584	QRZ0052-4R7	CARBON RESISTOR	1
⚠	R969	QRZ0052-470	F.RESISTOR	1
	RN701	VCR0003-003	C.R.BLOCK	1
	RN502	VCR0003-004	C.R.BLOCK	1
	CF701	CSB440E	LOCK	1
	CF501	EFO-A4ROM02A2	LOCK	1
	C501 ,C513	QCF11HP-103	C.CAPACITOR	18
	C514 ,C532 C533 -C535 C543 ,C545 C706 ,C711 C712 ,C713			

⚠	REF. NO	PARTS NO.	PARTS NAME	QTY
	C908 ,C909 C932 ,C936 C937 C101 ,C102 C143 ,C146	QCS11HJ-	C.CAPACITOR	22
	C148 ,C201 C202 ,C243 C246 ,C248 C503 ,C504 C540 ,C703			
	C708 ,C709 C920 ,C921 C928 ,C929 C934 ,C938 C147 ,C247	QCS12HJ-	C.CAPACITOR	2
	C105 ,C114 C122 ,C124 C132 ,C205 C214 ,C222 C224 ,C232	QEN41EM-	NP.E.CAPACITOR	11
	C933 C119 ,C131 C145 ,C219 C231 ,C245	QEN41HM-	NP.E.CAPACITOR	6
	C511	QET41AM-	E.CAPACITOR	1
	C104 ,C118 C128 ,C204 C218 ,C228 C502 ,C512 C538 ,C539	QET41AR-	E.CAPACITOR	22
	C541 ,C542 C544 ,C710 C901 ,C902 C910 ,C913 C914 -C916			
⚠	C931 C536 ,C537 C547 ,C701 C702 ,C704 C705 ,C906	QET41ER-	E.CAPACITOR	12
	C912 ,C917 C926 ,C930 C116 ,C117 C126 ,C127 C216 ,C217	QET41HR-	E.CAPACITOR	23
	C226 ,C227 C301 ,C302 C401 ,C402 C507 -C509 C516 ,C517			
	C527 ,C531 C905 ,C907 C911 ,C935 C103 ,C106 C113 ,C120	QFN41HJ-	M.CAPACITOR	17

⚠	REF. NO	PARTS NO.	PARTS NAME	REMARKS	QTY
	C121 ,C123 C137 ,C142 C203 ,C206 C213 ,C220 C221 ,C223				
	C237 ,C242 C525 C521 ,C918 C924 ,C925 C919	 QFP42AJ- QFP42XJ-	 P.S.CAPACITOR P.P.CAPACITOR		 4 1
	C112 ,C115 C125 ,C135 C136 ,C138 C139 ,C144 C212 ,C215	QFV41HJ-	TF.CAPACITOR		19
	C225 ,C235 C236 ,C238 C239 ,C244 C523 ,C524 C526				
	J501 FL701 TH101,TH201 	QMS3A10-020 BG-216Z ERT-D2FHL202S VMZ0015-001 VMZ0016-002	JACK FL TUBE THERMISTOR POST PIN TAB ASS'Y	 DOLBY TEST POINT	1 1 2 1 1
	   	VMJ3004-102 QMS6302-119 VMZ0043-001	JACK ASS'Y JACK FUSE CLAMP	LINE IN/OUT HEAD PHONE 	1 1 4

Location of P.C. Board Parts



Earth
IC & Transistor

Fig. 17

Exploded View of Enclosure Assembly

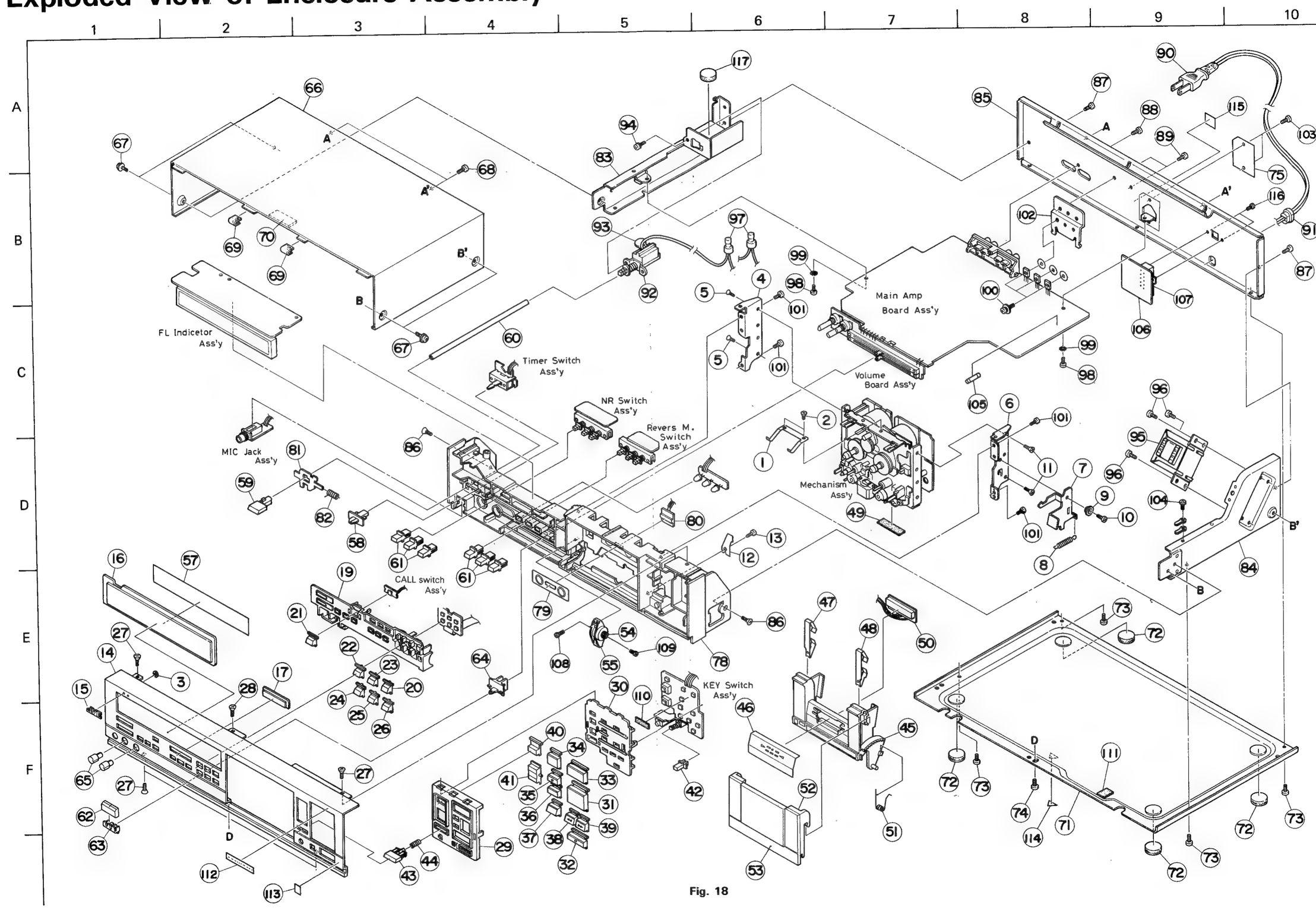


Fig. 18

⚠ parts are safety assurance parts.

Enclosure Assembly Parts List

When replacing those parts, make sure to use the specified one.

⚠	REF.	PARTS NO.	PARTS NAME	REMARKS	QTY
	1	VKY4282-001	PACK SPRING		1
	2	SDSP2604Z	SCREW		2
	3	NSS2000Z	PUSH NUT		1
	4	VKL5642-001	MECHA BRACKET,L		1
	5	VKZ4143-002	SCREW		2
	6	VKL5643-001	MECHA BRACKET,R		1
	7	VKL5644-001	EJECT LEVER		1
	8	VKW3002-138	SPRING		1
	9	VKH3001-024	COLLAR		1
	10	SDST2606Z	SCREW		1
	11	VKZ4143-002	SCREW	MECHA BRAKET	2
	12	VKY4376-002	SPRING	F.PANEL	1
	13	SBSF3008Z	T.SCREW		1
	14	VJC1387-001	FRONT PLATE		1
	15	E70913-001	MARK		1
	16	VJK3217-003	FINDER		1
	17	VJK4186-004	INDICATOR LENS		1
	19	VJD3519-001	ESCUTCHEON		1
	20	VXP4347-001	PUSH BUTTON	RESET	1
	21	VXP4347-002	PUSH BUTTON	CALL	1
	22	VXP4347-003	PUSH BUTTON	PLAY	1
	23	VXP4347-004	PUSH BUTTON	STOP	1
	24	VXP4347-005	PUSH BUTTON	MODE	1
	25	VXP4347-006	PUSH BUTTON	T.LENGTH	1
	26	VXP4347-007	PUSH BUTTON	SCAN SET	1
	27	SSSF3008Z	SCREW	F.PANEL/F.PANEL	4
	28	SSST3006Z	SCREW	MECHA/F.PANEL	1
	29	VJD3520-002	ESCUTCHEON		1
	30	VKS3243-001	P.BUTTON CASE		1
	31	VXP3121-001	PUSH BUTTON	PANEL	1
	32	VXP3122-001	PUSH BUTTON	STOP	1
	33	VXP3123-001	PUSH BUTTON	3AUSE	1
	34	VXP3123-002	PUSH BUTTON	DIRECTION	1
	35	VXP3124-001	PUSH BUTTON	REC	1
	36	VXP3124-002	PUSH BUTTON	REC MUTE	1
	37	VXP3125-001	PUSH BUTTON	SCAN	1
	38	VXP3125-002	PUSH BUTTON	REW	1
	39	VXP3125-003	PUSH BUTTON	FF	1
	40	VXP3126-001	PUSH BUTTON	MODE	1
	41	VXP3127-001	PUSH BUTTON	FORTH/BACK	1
	42	VXP4429-001	PUSH BUTTON	BLANK SKIP	1
	43	VXP4349-00A	PUSH BUTTON	EJECT	1
	44	VKW3001-063	SPRING	CONPLTION	1
	45	VJT2100-002	CASSETTE HOLDER		1
	46	VJD4870-001	PLATE		1
	47	VKY4382-003	SPRING		1
	48	VKY4382-004	SPRING		1
	49	VYSA1R4-066	SPACER	HOLDER WIRE	1
	50	SLA-5641-08	L.E.D.		1
	51	VKW3006-113	SPRING	C.HOLDER	1
	52	VJT3134-001	LID		1
	53	VJT3135-001	LID PLATE		1
	54	VYH5133-002	GEAR		1
	55	VYH5134-002	DAMPER HOLDER		1
	57	VJD4615-004	FINDER		1
	58	VXS4041-005	SLIDE KNOB	TIMER	1
	59	VXP4345-001	PUSH BUTTON	POWER	1
	60	VKS4003-008	PIPE		1
	61	VXP4346-001	PUSH BUTTON	R.MODE & NR	6
	62	VXS4116-001	SLIDE KNOB	INPUT	1
	63	VKS3183-001	LEVER		1
	64	VKS3184-001	SLIDE LEVER		1
	65	VXL4181-005	KNOB	OUTPUT	2
	66	VJC2101-005	TOP COVER		1
	67	VKZ3001-004	SCREW		4
	68	SDST3006N	SCREW		2
	69	VYSA1R6-036	SPACER		2
	70	VYSR103-019	SPACER		1

NOTE:
Entry of the assembly part number ZCDDVR77□-FS
↑
└ Enter the code name which is on the name plate and order the part.

⚠	REF.	PARTS NO.	PARTS NAME	REMARKS	QTY
	71	VJC1195-004	BOTTOM COVER		1
	72	VJF4003-002	FOOT		4
	73	SDST3004Z	SCREW		4
	74	SBSF3010Z	SCREW		1
	75	VYN2137-002KA	NAME PLATE	DD-VR77B	1
		VYN2137-003KA	NAME PLATE	DD-VR77A	1
		VYN2137-004KA	NAME PLATE	DD-VR77C	1
		VYN2137-005KA	NAME PLATE	DD-VR77E	1
		VYN2137-006KA	NAME PLATE	DD-VR77J	1
		VYN2137-007KA	NAME PLATE	DD-VR77U	1
	78	VJC1386-002	FRONT PANEL		1
	79	VJD4437-004	DISK PLATE	F.PANEL	1
	80	LD-702YU	L.E.D	F.PANEL	1
	81	VKL5490-002	BRACKET		1
	82	VKW3001-077	SPRING		1
	83	VKL3488-001	AMP CHASSIS(L)		1
	84	VKL3494-001	AMP CHASSIS(R)		1
	85	VJC2127-009	REAR PANEL	DD-VR77C/J	1
		VJC2127-010	REAR PANEL	DD-VR77A/B/E/U	1
	86	SSST3008Z	SCREW	F.PANEL	2
	87	SDST3006N	SCREW	R.PANEL	2
	88	SDSF3008N	SCREW	PIN JACK	1
	89	SDSF3008N	SCREW	HEAT SINK	2
⚠	90	QMP1200-200	POWER CORD	DD-VR77C/J	1
⚠		QMP2560-200	POWER CORD	DD-VR77A	1
⚠		QMP3900-200	POWER CORD	DD-VR77E	1
⚠		QMP7600-200	POWER CORD	DD-VR77U	1
		QMP9017-008BS	POWER CORD	DD-VR77B	1
⚠	91	QHS3876-162	S.R.BUSHING	DD-VR77A	1
		QHS3876-162BS	S.R.BUSHING	DD-VR77B	1
⚠	92	QSP1110-305	PUSH SWITCH	DD-VR77A/E	1
		QSP1110-305BS	PUSH SWITCH	DD-VR77B	1
⚠		QSP1110-306	PUSH-SWITCH	DD-VR77U	1
⚠		QSP1110-308	PUSH SWITCH	DD-VR77C/J	1
⚠	93	QCZ9014-103	C CAP	DD-VR77J	1
⚠		QCZ9015-103	C.CAPACITOR	DD-VR77U	1
⚠		QFZ9010-103	M.CAPACITOR	DD-VR77B/A/E	1
	94	LPSP3006Z	SCREW	POWER SW	1
⚠	95	VTP60A5-011B	POWER TRANSF.	DD-VR77C/J	1
⚠		VTP60C5-011B	POWER TRANSF.	DD-VR77A/E	1
⚠		VTP60C5-011BBS	POWER TRANS	DD-VR77B	1
⚠		VTP60N5-011B	POWER TRANS	DD-VR77U	1
	96	SDST3006Z	SCREW	POWER TRANS	3
	97	TAW000504-01	CONNECTOR	DD-VR77C/J	2
	98	SDST3006Z	SCREW	P.C.B.	2
	99	WBS3000N	WASHER	P.C.B. EARTH	2
	100	DPSP3008Z	SCREW	Q516.Q517.Q521	3
	101	SBSF3010Z	SCREW	MECHA/F.PANEL	4
	102	VMH4006-002	HEAT SINK		1
	103	SDST3006N	SCREW		2
	104	SDST3006Z	SCREW		1
⚠	105	QMF51A2-R80	FUSE	DD-VR77A/E	2
⚠		QMF51A2-R80BS	FUSE	DD-VR77B	2
⚠		QMF51C3-R80	FUSE	DD-VR77U	1
⚠	106	VMW4680-001	PW BOARD	DD-VR77B/A/E	1
⚠	107	QSS2325-203	SLIDE SWITCH	DD-VR77A/E	1
⚠		QSS2325-203BS	SLIDE SWITCH	DD-VR77B	1
⚠		QSS2325-205	SWITCH	DD-VR77U	1
	108	SPSK1720M	SCREW	DAMPER	1
	109	SBSB2004Z	SCREW	DAMPER	1
	110	F00303-34	SPACER		1
	111	VYSS101-014	SPACER		1
	112	TJL000420-01	LABEL	DD-VR77B	1
	113	VNC5004-001	STICKER	DD-VR77B/E	1
	114	VND4113-001	G.CAUTION	DD-VR77B/J	1
	115	T44362-001	CSA LABEL	DD-VR77C	1
		VND4037-002	F MARK	DD-VR77E	1
	116	SDSP3006N	SCREW		2
		ZCDDVR77□-F	FRONT PLATE ASS'Y		1
	45~48	ZCDDVR77□-CH	CASSETTE HOLDER ASS'Y		1
	52~53	ZCDDVR77□-CL	CASSETTE LIDE ASS'Y		1

Exploded View of Mechanism Assembly

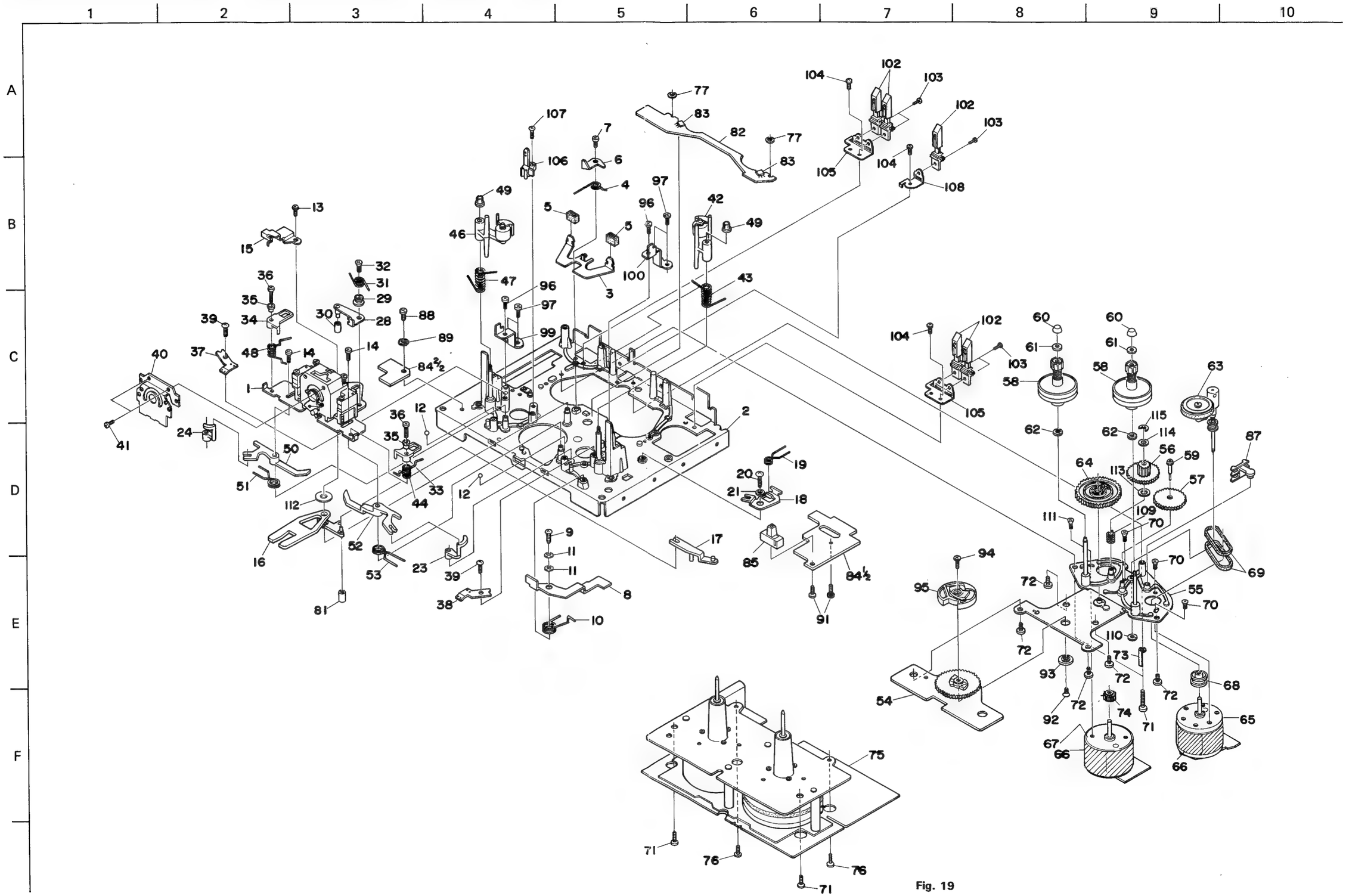


Fig. 19

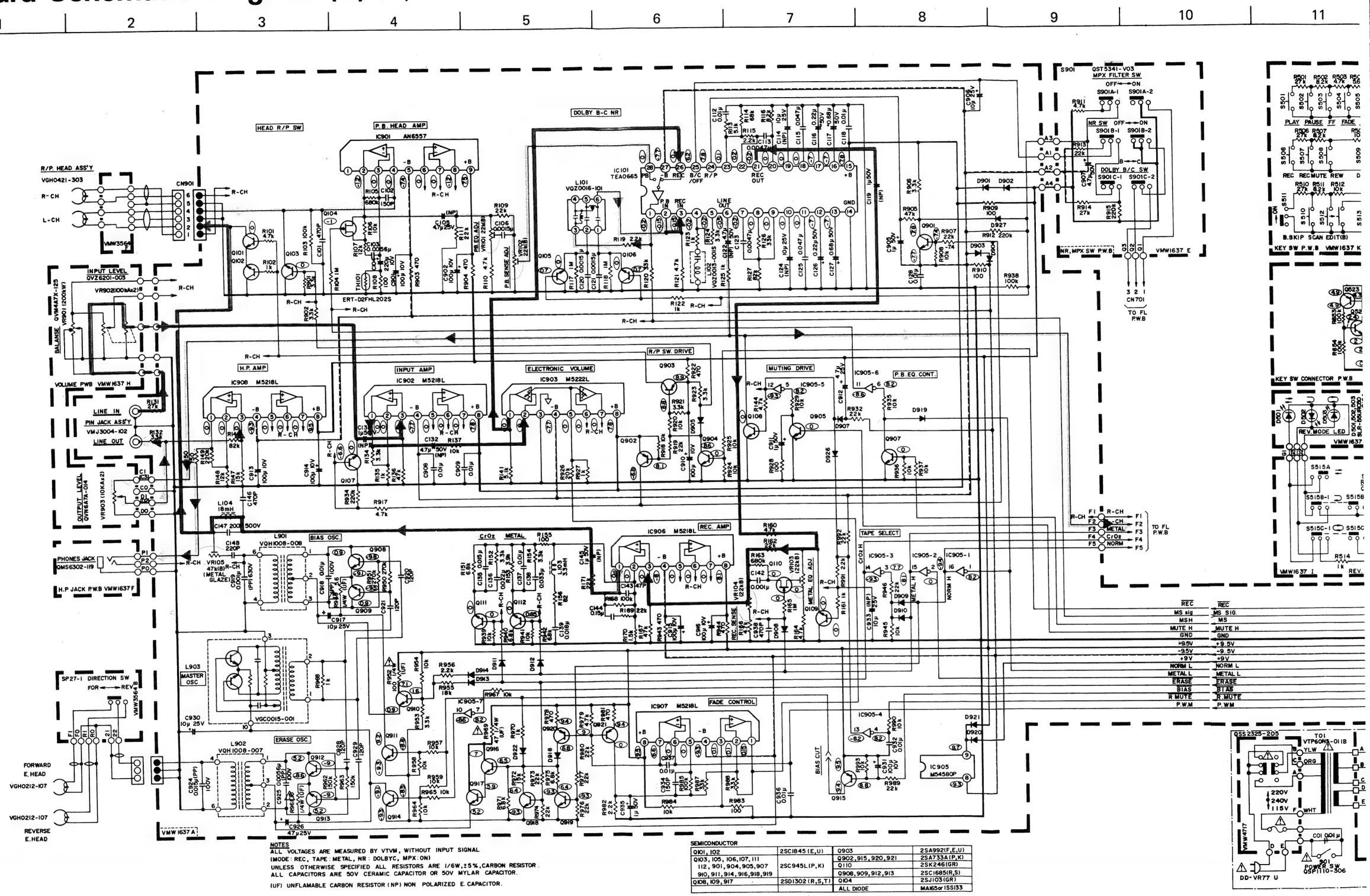
Mechanism Assembly Parts List

⚠ parts are safety assurance parts.
When replacing those parts, make sure to use the specified one.

⚠	REF.	PARTS NO.	PARTS NAME	REMARKS	QTY
	1	VDG2137-001MA1	HEADBASE ASS'Y		1
	2	VKL1221-00L	CHASSIS BASE		1
	3	VKL5347-002	BRAKE BAR		1
	4	VKW4391-001	SPRING	BRAKE BAR	1
	5	VKZ4129-001	BRAKE RUBBER		2
	6	VKL5409-003	C.LEVER		1
	7	SDSF2606Z	SCREW		1
	8	VKL5350-005	SAFETY LEVER		1
	9	SDSF2606Z	SCREW		1
	10	VKW4388-001	SPRING		1
	11	Q03093-622	WASHER		2
	12	T41615-004	STEEL BALL		2
	13	SDSP2003Z	SCREW		1
	14	SPSP2003Z	SCREW		2
	15	VKY4294-005	SPRING PLATE		1
	16	VKL5833-00A	R LEVER ASSY		1
	17	VKS4517-003	ARM		1
	18	VKL5349-004	SWITCH LEVER		1
	19	VKW4379-001	SPRING		1
	20	SDSF2606Z	SCREW		1
	21	Q03091-150	WASHER		1
	23	VKS4539-004	KICK LEVER (R)		1
	24	VKS4539-005	KICK LEVER (L)		1
	28	VKL5390-00C	LEVER		1
	29	VKH4421-004	COLLAR		1
	30	VKH3000-072	COLLAR		1
	31	VKW4431-001	SPRING		1
	32	SPSP2006Z	SCREW		1
	33	VKS4515-007	GUIDE LEVER		1
	34	VKS4515-008	GUIDE LEVER		1
	35	VKH3000-059	COLLAR		2
	36	SPSP2006Z	SCREW		2
	37	VKY4281-005	SPRING PLATE(L)		1
	38	VKY4281-004	SPRING PLATE(R)		1
	39	SDSF2606Z	SCREW		2
	40	VKZ4242-001	HEAD WIRE CLAMP		1
	41	VKZ4204-001	SCREW		2
	42	VKP4132-00L	PINCH ROLLER		1
	43	VKW3006-067	SPRING		1
	44	VKW4384-002	SPRING		1
	46	VKP4132-00M	PINCH ROLLER		1
	47	VKW4407-001	SPRING		1
	48	VKW4390-002	SPRING		1
	49	VKS4513-001	ADJUST SCREW		2
	50	VKZ4197-003	P.ROLLER LEVER		1
	51	VKW4525-001	SPRING		1
	52	VKZ4192-001	LEVER		1
	53	VKW4524-001	SPRING		1
	54	VKZ4272-00A	CAM SWITCH ASSY		1
	55	VKL3429-00B	REEL BASE ASS'Y		1
	56	VKR3001-005	GEAR		1
	57	VKR3001-006	GEAR		1
	58	VKR4281-00E	REEL DISK		2
	59	VKS4533-002	STOPPER		1
	60	VKS4131-001	REEL STOPPER		2
	61	VKR4170-001	RING		2

⚠	REF.	PARTS NO.	PARTS NAME	REMARKS	QTY
	62	VKZ4003-003	FELT		2
	63	VKR4323-00G	IDLER SYSTEM		1
	64	VKS3244-001	GEAR		1
⚠	65	BFS7B13	DC MOTOR		1
	66	FE-ZMS409	SHIELD PLATE		2
⚠	67	MMN-6C2RK	DC MOTOR		1
	68	VKS4607-002	MOTOR PULLEY		1
	69	VKB3000-086(1)	BELT ASSY		1
	70	VKZ4128-001	SCREW		3
	71	SDSP2612Z	SCREW		4
	72	SDSF2606Z	SCREW		5
	73	VKY4298-001	EARTH PLATE		1
	74	VKR4326-001	MOTOR GEAR		1
⚠	75	MC956C-3	MOTOR ASS'Y		1
	76	SDSP2618Z	SCREW		2
	77	Q03093-522	WASHER		2
	81	VKH3000-060	COLLAR		1
	82	VMW4653-001	PRINTED BOARD		1
	83	DN6838A	I.C.		2
	84	VMW3564-005	PW BOARD		1
	85	QSS2201-008	SLIDE SWITCH		1
	87	VKS4608-002	BELT GUIDE		1
	88	SPSP2605Z	SCREW		1
	89	WBS2600N	WASHER		1
	91	VKZ4128-001	SCREW		2
	92	SSSP2603Z	SCREW		1
	93	VKH4430-001	COLLER		1
	94	SPSP2003Z	SCREW		1
	95	VKS3249-001	CAM		1
	96	VKZ4194-001	S.SCREW		2
	97	SPSK2028Z	SCREW		4
	99	VKL5464-003	GUIDE BRACKET		1
	100	VKL5464-004	GUIDE BRACKET		1
	102	VSH1133-002	LEAF SWITCH		5
	103	SDSP2004Z	SCREW		5
	104	LPSP2604Z	SCREW		3
	105	VKL5550-001	SW BRACKET(1)		2
	106	SPI-302	REFLECTOR		1
	107	SDSF2608Z	SCREW		1
	108	VKL5551-001	SW BRACKET(2)		1
	109	VKW4531-001	COMP SPRING		1
	110	THIS DWG.	WASHER		1
	111	LPSP2604Z	SCREW		1
	112	WNS4000N	WASHER		1
	113	THIS DWG.	WASHER		1
	114	THIS DWG.	WASHER		1
	115	REE2000	E. RING		1

Standard Schematic Diagram (2) (Amplifier/Mechanism Control Circuit)



NOTES
ALL VOLTAGES ARE MEASURED BY VTVM, WITHOUT INPUT SIGNAL
(MODE: REC, TAPE: METAL, NR: DOLBYC, MPX: ON)
UNLESS OTHERWISE SPECIFIED ALL RESISTORS ARE 1/6W, ±5%, CARBON RESISTOR.
ALL CAPACITORS ARE 50V CERAMIC CAPACITOR OR 50V MYLAR CAPACITOR.
(UF) UNFLAMABLE CARBON RESISTOR (NP) NON POLARIZED E. CAPACITOR.

SEMICONDUCTOR

Q101, 102	2SC1845 (E,U)	Q903	2SA992(F,E,U)
Q103, 105, 106, 107, 111	2SC945L(P,K)	Q902, 915, 920, 921	2SA733A(P,K)
112, 901, 904, 905, 907		Q110	2SK246(GR)
910, 911, 914, 916, 918, 919		Q908, 909, 912, 913	2SC1685(R,S)
Q108, 109, 917	2SD1302(R,S,T)	Q104	2SJ103(GR)
		ALL DIODE	MA165or1SS133

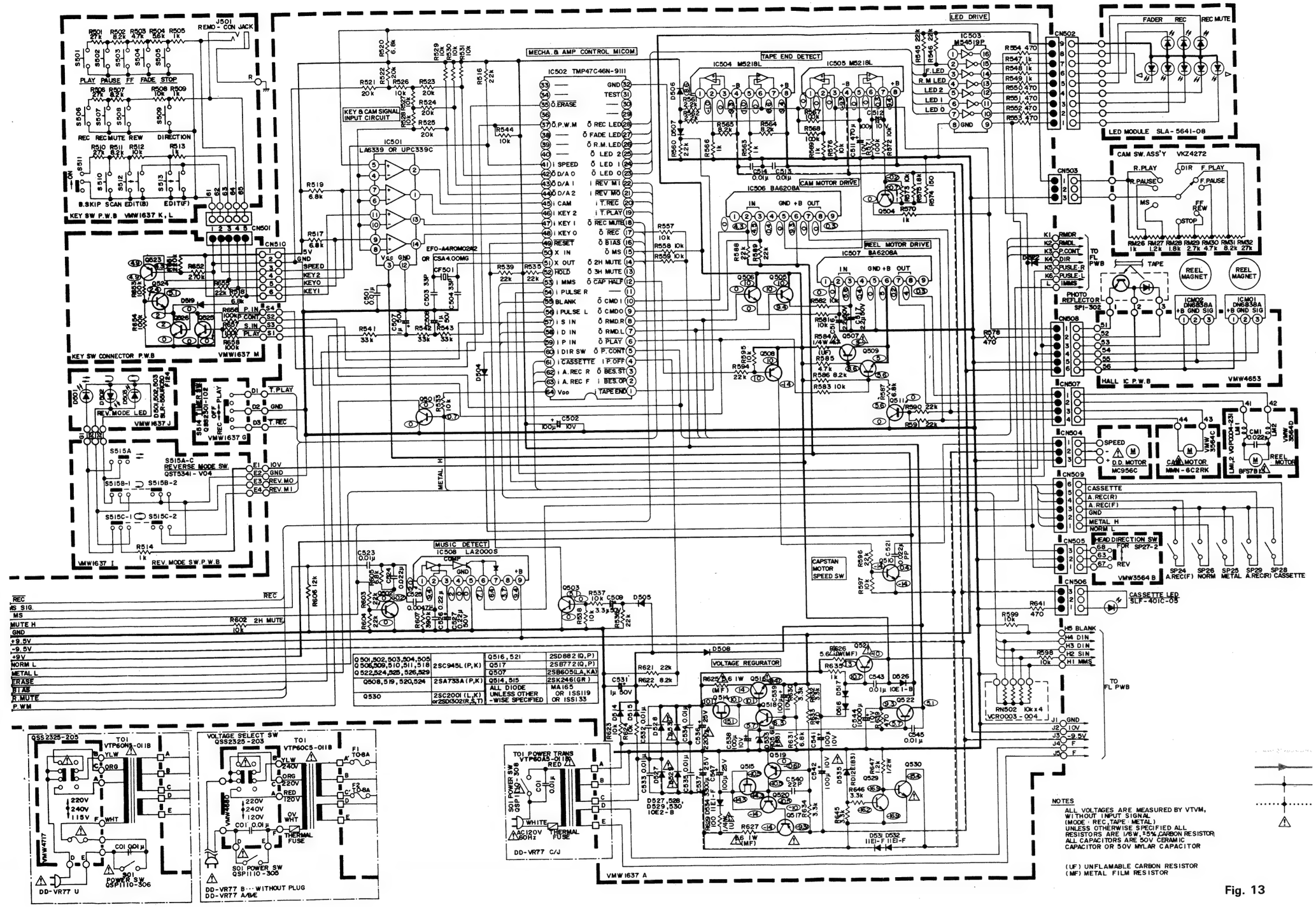
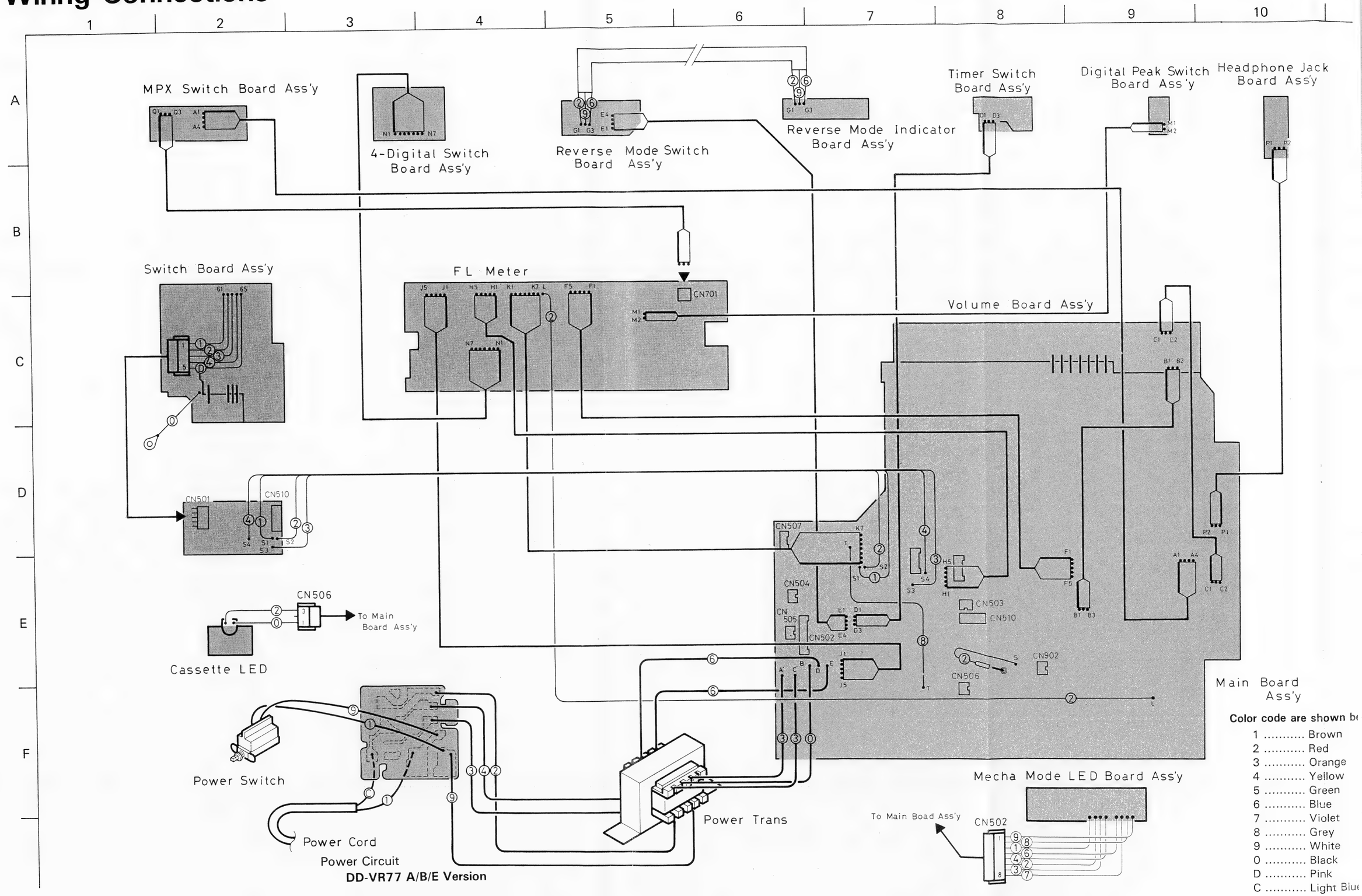

MECHA. & AMP CONTROL MICOM
IC502 TMP47C46N-9111
KEY & CAM SIGNAL INPUT CIRCUIT
IC501 LA6339 OR UPC339C
TAPE END DETECT
IC504 M5218L
IC505 M5218L
LED DRIVE
IC503 M54519P
CAM MOTOR DRIVE
IC506 BA6208A
REEL MOTOR DRIVE
IC507 BA6208A
MUSIC DETECT
IC508 LA2000S
VOLTAGE REGURATOR
CAPSTAN MOTOR SPEED SW
J501 REMO-CON JACK
KEY SW P.W.B VMW1637 K, L
KEY SW CONNECTOR P.W.B VMW1637 M
REV. MODE LED VMW1637 J
REV. MODE SW P.W.B VMW1637 I
VMW1637 G
VMW1637 A
DD-VR77 C/J
DD-VR77 U
DD-VR77 B···WITHOUT PLUG
DD-VR77 A/B/E
LED MODULE SLA-5641-08
CAM SW. ASS'Y VKZ4272
HALL IC P.W.B VMW4653
PHOTO REFLECTOR SPI-302
REEL MAGNET
CASSETTE LED SLF-401C-05
RN502 10k x 4 VCR0003-004
TO FL PWB
SPEED
D.D. MOTOR MC956C
CAM MOTOR MMN-6C2RK
REEL MOTOR BFS7B
HEAD DIRECTION SW SP27-2
SP24 A.REC(F)
SP26 NORM
SP25 METAL
SP29 A.REC(R)
SP28 CASSETTE
REVERSE MODE SW. QST5341-V04
POWER SW QSP1110-306
VOLTAGE SELECT SW QSS2325-203
SOI POWER SW QSP1110-306
SOI POWER TRANS VTP60A5-01 IB
THERMAL FUSE
Q501,502,503,504,505 Q506,509,510,511,518 Q522,524,525,526,529 2SC945L(P,K)
Q508,519,520,524 2SA733A(P,K)
Q530 2SC2001(L,K) or 2SD1302(R,S,T)
Q516,521 2SD882(Q,P)
Q517 2SB772(Q,P)
Q507 2SB605(LA,KA)
Q514,515 2SK246(GR)
ALL DIODE UNLESS OTHER-WISE SPECIFIED MA165 OR 1SS119 OR 1SS133
NOTES
ALL VOLTAGES ARE MEASURED BY VTVM, WITHOUT INPUT SIGNAL (MODE: REC, TAPE: METAL)
UNLESS OTHERWISE SPECIFIED ALL RESISTORS ARE 1/6W, ±5% CARBON RESISTOR
ALL CAPACITORS ARE 50V CERAMIC
CAPACITOR OR 50V MYLAR CAPACITOR
(UF) UNFLAMABLE CARBON RESISTOR
(MF) METAL FILM RESISTOR
Blue line shows the signal at playback.
Red line shows the signal at recording.
+B circuit.
−B circuit
parts are safety assurance parts. When replacing those parts, make sure to use the specified one.

Fig. 13

Wiring Connections



DD-VR77 A/B/E Version

Color code are shown b

1	Brown
2	Red
3	Orange
4	Yellow
5	Green
6	Blue
7	Violet
8	Grey
9	White
0	Black
D	Pink
C	Light Blue

11 12 13 14 15 16 17 18 19 20 21

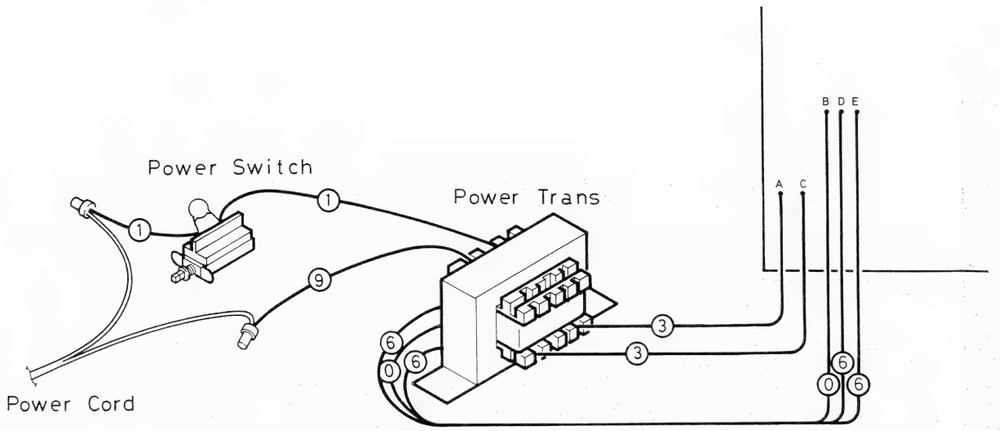
e Jack
Ass'y

d
'y

are shown below

... Brown
... Red
... Orange
... Yellow
... Green
... Blue
... Violet
.... Grey
... White
... Black
... Pink
.... Light Blue

DD-VR77 C/J Version



DD-VR77 U Version

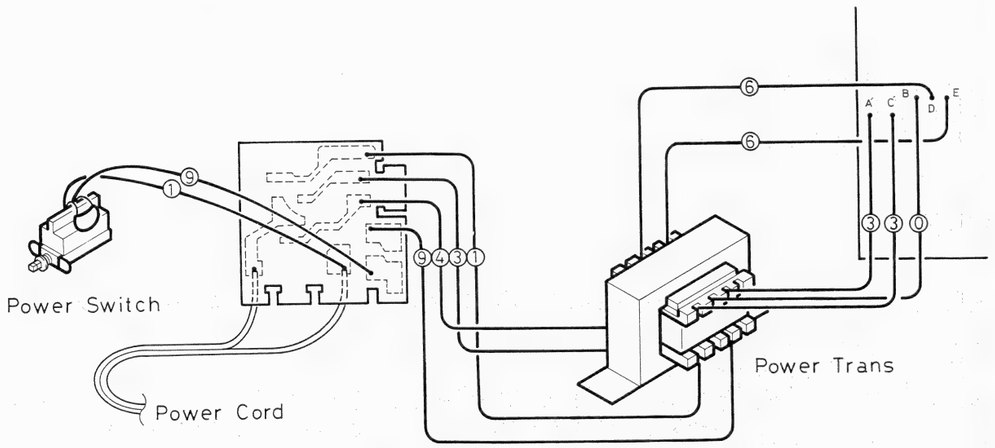
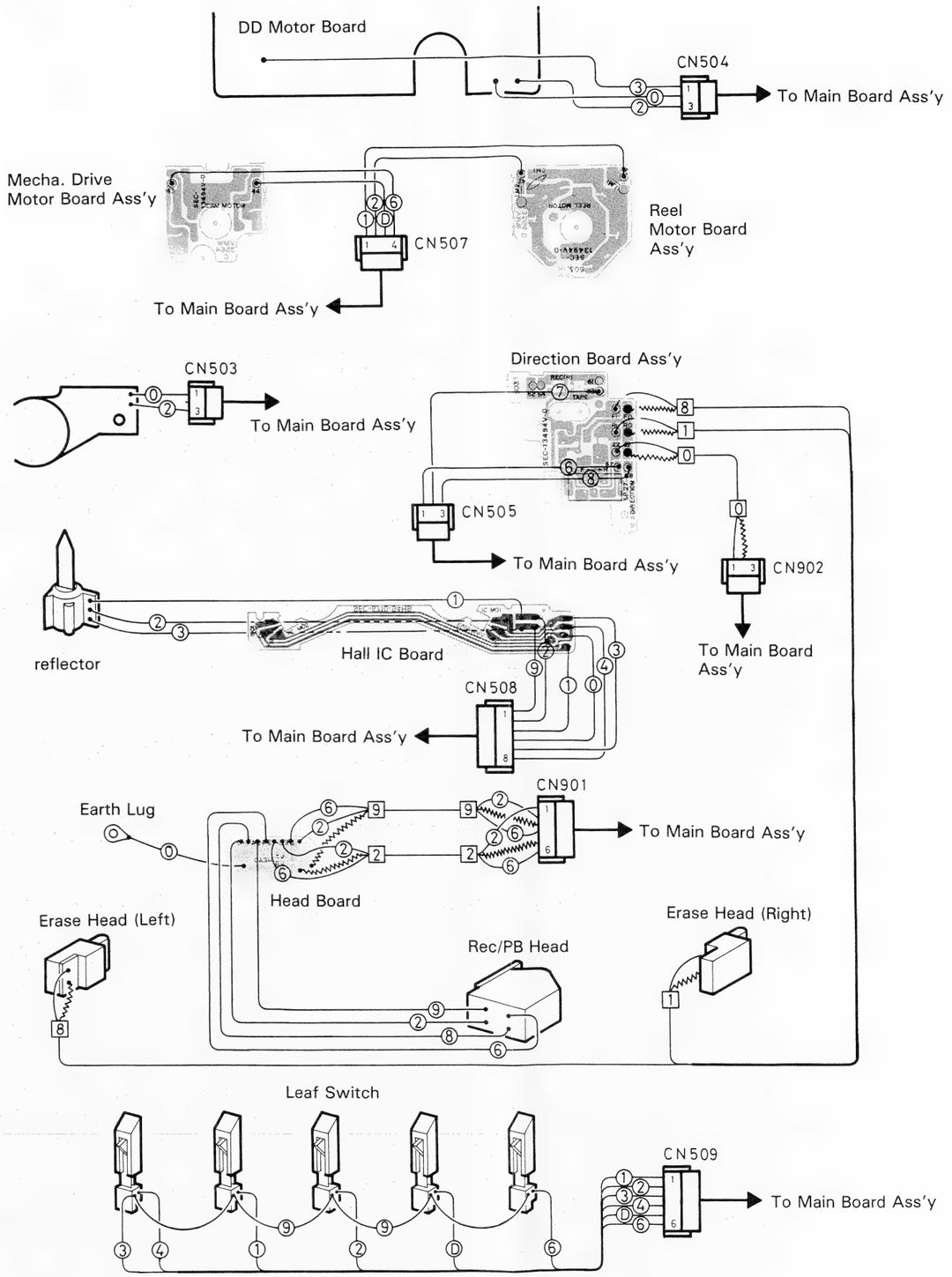


Fig. 14



MODEL DD-VR77

CIRCUIT DESCRIPTIONS

I DOLBY NR

TEA0665 used as IC101 incorporates the functions normally performed by NE652 and NE654, Fig. 1 shows the internal construction of this IC.

The recording/playback singal is input to pin (26) or (28) depending on whether it is the recording or playback mode and the signal is output from pin (1) and input to pin (2) in playback and pin (3) in recording, after passing through the MPX filter. In the DD-VR77, the playback signal as well as the recording signal is passed through the MPX filter during playback. As the MPX filter incorporates the bias filter in addition to the FM pilot signal (19 kHz) filter, it can be used to filter only the bias filter by switching the 19 kHz filter (Q105, 106) OFF during playback. The purpose of this is the prevent bias signal components from leaking in the editing-cut and editing-fade operations. D927 forces Q105 and Q106 OFF even when the MPX switch is ON in the playback mode. Q901 controls the record/play switching of TEA0665.

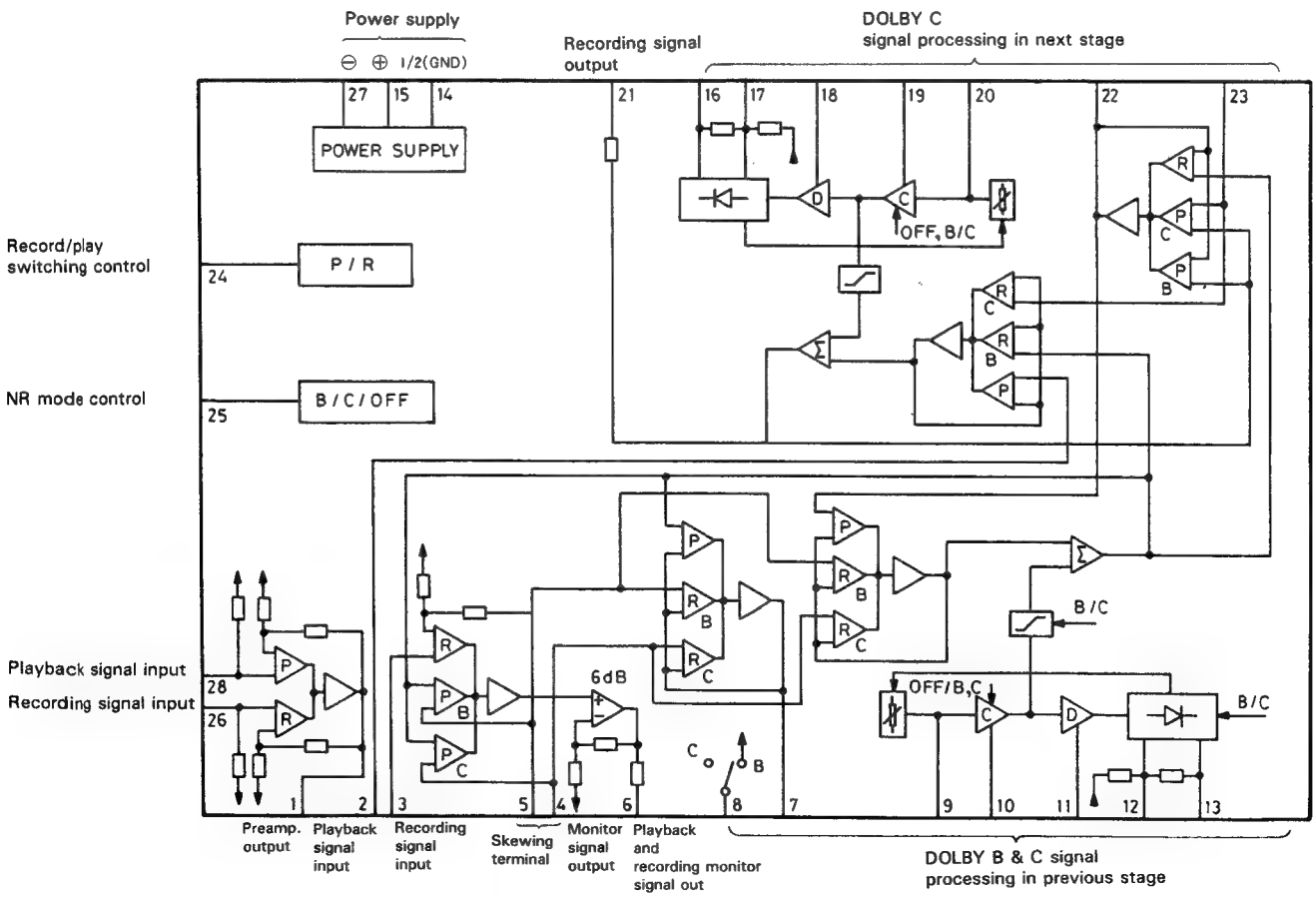


Fig. 1 Internal structure of TEA0665

II Recording Input Amplifier, Electronic Volume Control and Control Circuits

The recording signal input to the line input circuit is amplified and its impedance is converted (to low impedance) by IC902 after passing through the balance VR (VR901) and input VR (VR902); it then passes through the electronic volume control (IC903) before being input to the DOLBY NR IC.
Q107 mutes the recording signal so that there is no crosstalk with the playback signal in the playback mode.
IC902 amplifiers the recording signal by 12 dB and converts the signal to one with low impedance before supplying it to the electronic volume control. This is necessary because the electronic volume control IC (IC903) is a current Amplifier. R137 converts the signal voltage into a signal current making the operation of IC902 stable through the elimination of other factors including impedance conversion due to the position of the variable resistor.
After impedance conversion, the signal is input to pin (2) of IC903 and is output from pin (3).
The output signal current of IC903 is converted into voltage by the parallel resistances of R141 and the input impedance of the DOLBY IC (approx. 50 kohms) for supply to the DOLBY IC.

The electronic volume control IC operates only in automatic fade-in and fade-out and does not attenuate the signal at other times.
Signal attenuation control to control automatic fade-in and fade-out is done by applying a control voltage to pin (5); the attenuation is 1.4 dB with a 0 V control voltage, approx. 60 dB with a −0.2 V control voltage and a maximum of 90 dB with a control voltage of −0.3 V so that attenuation is varied by slightly changing the control voltage.
For this reason, control voltages of 0 to −5 V are divided by R926 and R297 before being supplied to control pin (5).
This control signal is provided by the pulse width modulated (PWM) signal output from pin (37) of the mechanism control microprocessor (IC502). This PWM signal is also output in the editing operation and controls the erase oscillator at this time. The PWM signal is not effective because automatic fade is only operable during recording and the erase oscillation signal is supplied by the bias control signal although the PWM signal is output during the automatic fade and editing fade operations. The variation of the electronic volume control has no effect on the playback signal because the editing fade operation takes place in the playback mode.

PWM signal

- The PWM signal divides 5.12 ms into 256 pulses as shown in Fig. 4 and it obtains control voltages with a maximum width of 256 pulses.
  From this it will be seen that the time necessary to change the width of the PWM pulse from maximum to minimum is:
  5.12 m sec × 256 ÷ 1310 m sec = 1.31 sec
  However, there are three types of fade:
  Quick fade-out: approx. 2.5 sec.
  Quick fade-in, editing fade: approx. 5 sec.
  Normal fade-in/out: approx. 10 sec.
  These three fade times are obtained by producing the PWM signal with a changing pulse width while outputting a signal with the same pulse width.
  When it is approx. 2.5 sec., the signal is output twice, when it is approx. 5 sec., it is output four times, and when it is approx. 10 sec., it is output eight times.
  The exact times are 2.62, 5.24 and 10.48 sec.
- The PWM signal is converted to a continuous analog control signal through the high-cut filter (integrating circuit) consisting of R543, C508, R542 and C507; because it is a pulse train, it cannot be used as it is to control the electronic volume control. (If the smoothing characteristics of the high-cut filter are not complete, a ripple voltage with a period of 5.12 ms (approx. 200 Hz) will be output; this will operate the electronic volume con trol so that hum will occur during automatic fade-in and -out).

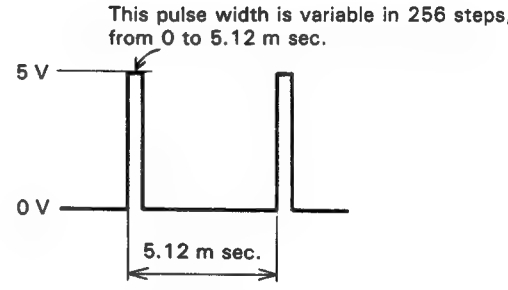


Fig. 2 PWM signal

Polarity switching is performed by IC907 since the analog control voltage obtained in this way changes between 0 and 5 V and it has opposite polarity to the voltage required by the electronic volume control, that is 0 to −0.24 V. Circuits concerned with the PWM signal are shown in Fig. 3.

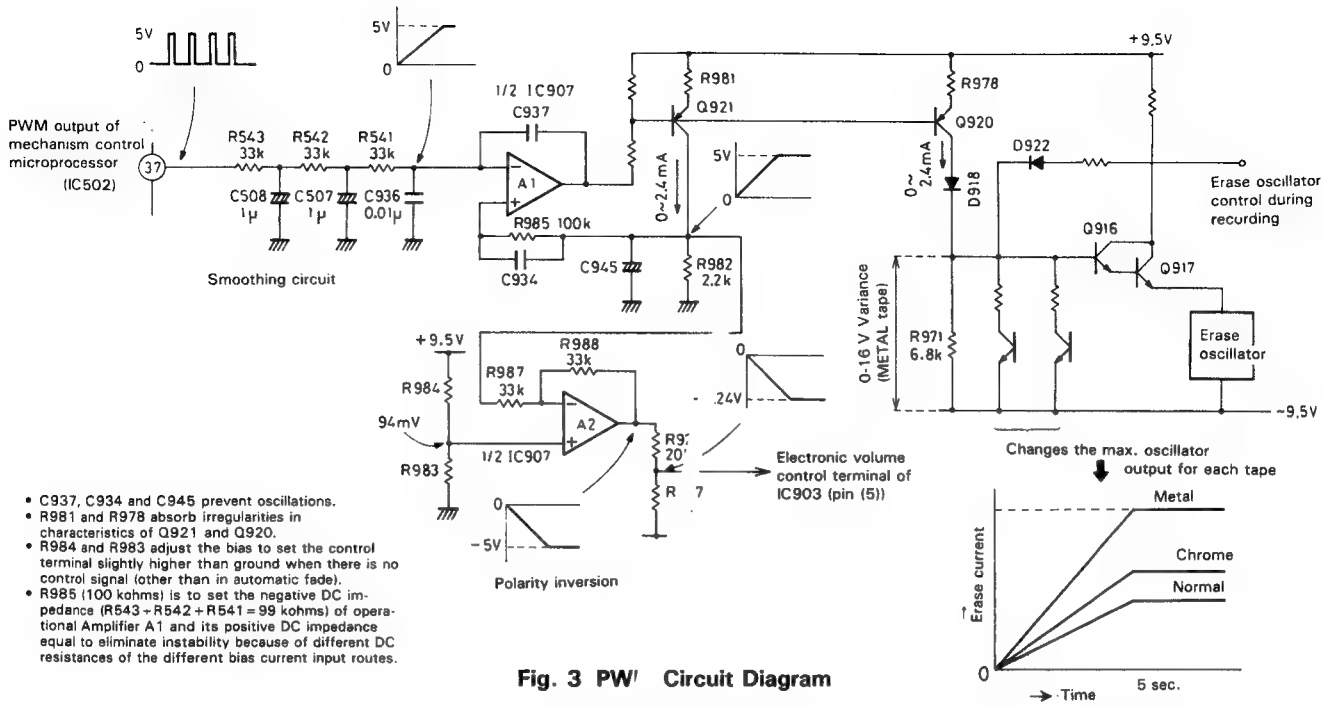


Fig. 3 PWM Circuit Diagram

A1 in IC907 shown in Fig. 3 together with Q921 functions both as a buffer Amplifier to receive the control signal through the high impedance integrated circuit and a current Amplifier to convert it to a current. The polarities of the voltages (0—5 V) converted by R982 are inverted by Amplifier A2 (with zero gain) in the IC then these converted voltages are divided by R926 and R927 to produce voltages of 0 to −0.24 V which are supplied to the electronic volume control IC903.

Also the current output from IC907 A1 is also necessary to control the erase oscillator in editing fade. It is necessary to convert the reference voltage from the (−) side of the erase oscillator because it is −9.5 V rather than ground potential and because a 15 V power supply is necessary for the erase oscillator to obtain the 180 mA erase current needed to erase metal tape; the 0 to 5 V control signals must be converted to −9.5 to +5.5 V. To do this, Q921 is controlled so that the 0 to 5 V control voltage fed to the inverting input of A1 in IC907 is equal to the output voltage across R928 and the 0 to 5 V is obtained across R982 (2.2 kohms) together with a current output of 0 to 2.4 mA. The bases of Q921 and Q920 are connected and R981 and R978 are equal forming a current mirror circuit. The current output from Q920 is converted to a voltage by R971 (the resistance of R971 for metal tape, R971 and R972 connected in parallel for chrome tape, R971 and R975 connected in parallel for normal tape) which passes through Q916 and Q917 and becomes the power supply voltage of the erase oscillator. For this reason, the power supply voltage of the erase oscillator changes from 0 to 15 V (for metal tape) and the erase current changes from 0 to 180 mA.

In normal recording, the bias control signal of the mechanism control IC is supplied through D922.

III Bias and Erase Oscillation Circuits

The DD-VR77 has three oscillation circuits, the master oscillator which determines the oscillation frequency, the bias oscillator and the erase oscillator. (In fact, the bias and erase oscillator circuits are Amplifying circuits tuned to the output frequency of the master oscillator.)

The reasons why this arrangement is necessary are:

1. The erase signal is required only in the editing-fade and editing-cut operations so separate erase and bias oscillators are required.
2. Combining the erase oscillator with the master oscillator is impossible since the forward and reverse oscillation frequencies are not equal because of the different impedances of the forward and reverse erase heads when only the erase circuit is oscillating. This is because the erase heads are independent.
3. Following these requirements, a separate master oscillator is required to determine the frequency.

Adjustment method

1. Adjust the core of L903 in the master oscillator circuit and set the output frequency across R986 to 81 kHz.
2. Adjust the core of bias oscillation coil L901 so that the output voltage across R952 (100 ohms) is minimum. (Make the current consumption minimum and tune to 81 kHz.)
3. Adjust the core of the erase oscillation coil (L902) so that the voltages across R969 (47 ohms) are low in both forward and reverse directions.

In editing fade, only the master and erase oscillators operate; the bias oscillator does not. (Q914 is ON, Q911 is OFF and pin (35) of the ERASE output of the mechanism control microprocessor (IC502) is L.)

Both Q914 and Q911 turn ON in normal recording (pin (35) of the ERASE output of the mechanism control microprocessor goes H and the output of OBIAS, pin (16), goes L: Q914 and Q911 are controlled by different terminals of the microprocessor.)

IV Quick reverse direction (tape end detection)

This circuit detects that light entering the phototransistor of the photoreflector (SPI-302) changes and the output voltage changes when the point where the magnetic coating of the tape gives way to the leader tape; this is output to the microprocessor. The difference from conventional circuits is that, with this construction, it is not necessary to adjust the sensitivity of the phototransistor. Fig. 4 shows the conventional circuit and Fig. 5 that used in the DD-VR77.

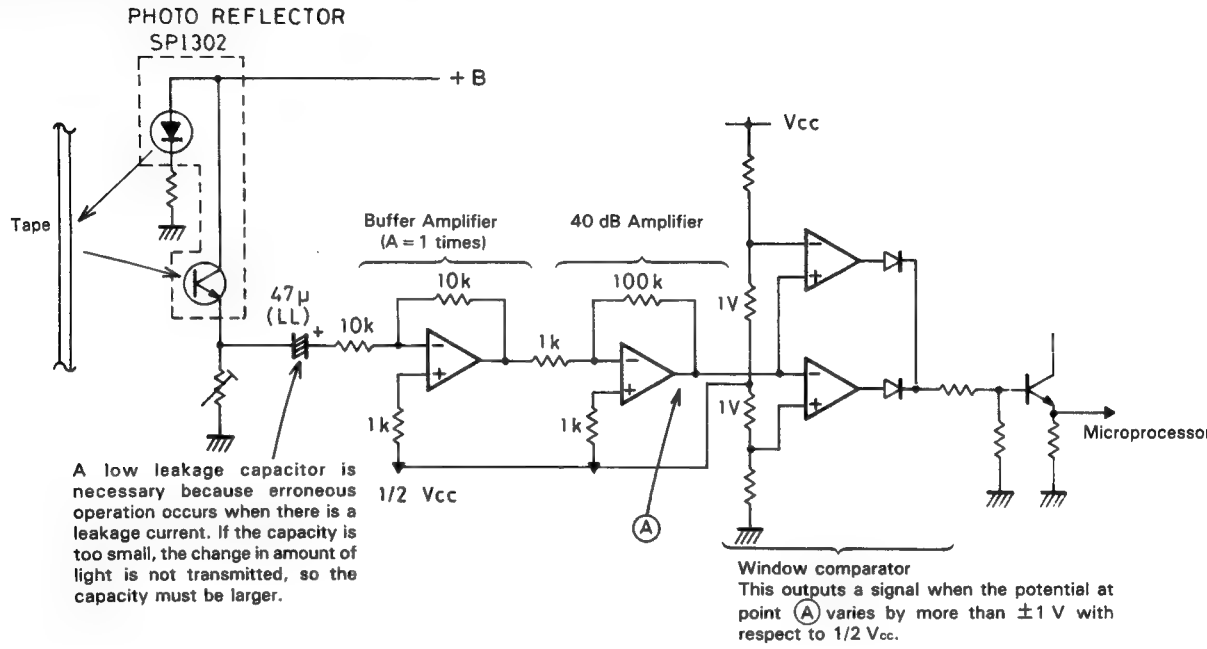


Fig. 4 Conventional quick reverse circuit

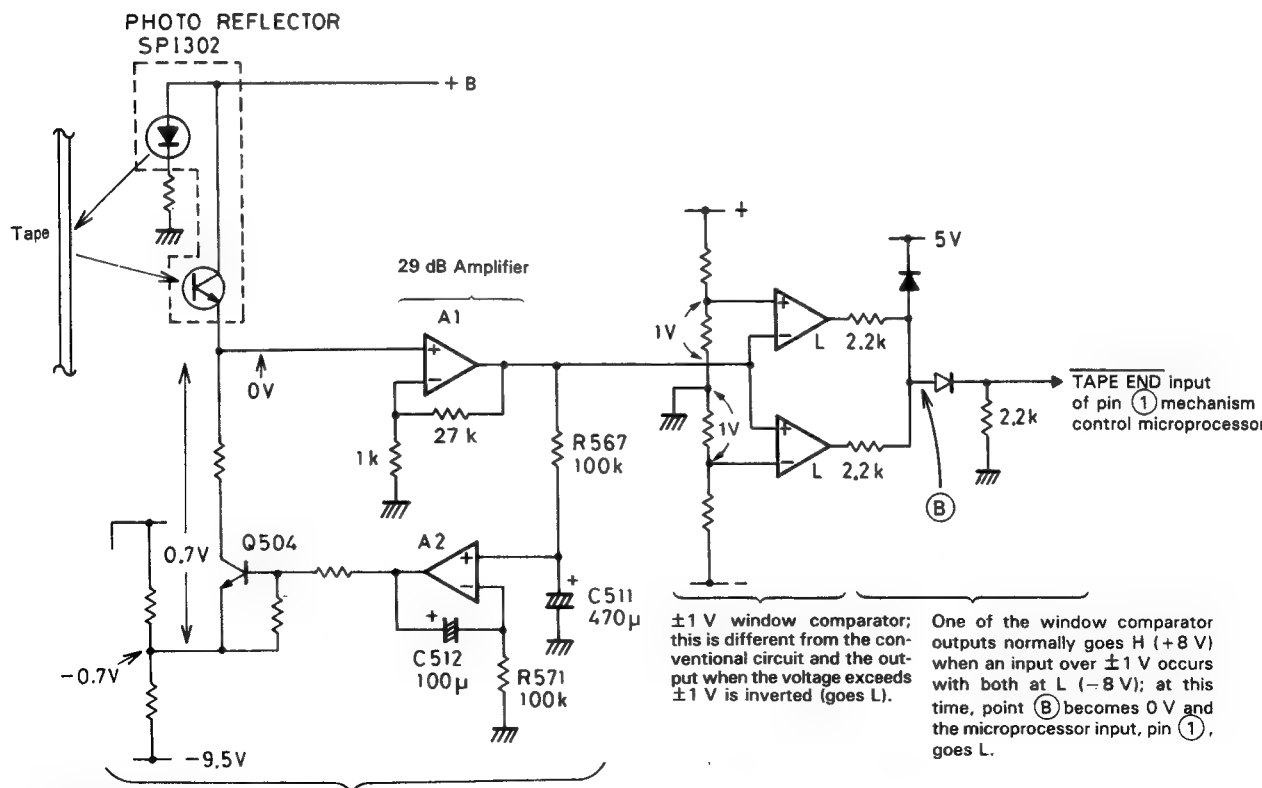


Fig. 5 Quick reverse detection circuit in the DD-VR77

V Cam/Reel motor drive

The operation modes of motor drive IC (BA6208A) are shown in Table 2.

Mode	Input		Output		Motor Operation	
	② Terminal	③ Terminal	⑦ Terminal	⑧ Terminal		
A	L	H	L	H	Rotates	Directions of rotation reverse
B	H	L	H	L	Rotates	
C	H	H	L	L	Motor terminals short-circuited (brake mode)	
D	L	L	Open	Open	Motor terminals open	

Table 2 Operation modes of BA6208A

Modes A and B:
The motor rotates; the directions of rotation are opposite.
Modes C and D:
The motor stops in both modes. In mode C, the motor terminals are short-circuited and it stops immediately with electromagnetic braking. In mode D, the motor terminals are open and the motor stops more slowly, rotating under its own inertia.
Mode C stop is used for the cam motor which must stop quickly at the point where the required mode is to be entered. On the other hand, mode D slow stop is used for the reel motor; if it stops too quickly when changing from the fast forward or scan mode to the stop mode, the tape will become slack.

In addition, there is the likelihood that static electricity will be generated since the head runs in contact with the head surface in scanning and there is the danger that the tape will be wrapped round the capstan even if it gets slightly slack so, when the mechanism control microprocessor outputs the reel stop signal (RMDR and RMDL go L), the reel motor rotates for a while because of the charge held in C516 or C517. Q505 and Q506 prevent the charge held in these capacitors flowing to the microprocessor and erroneous counter operation due to IC507 because it is the load when RMDR and RMDL are H and the H voltage decreases.
Q507 and Q509 switch the motor voltage to change the speed between fast (in fast-forward, rewind, scanning, etc.) and normal (recording, playback, editing, etc.)

Mode	Voltage
Normal speed	3.8 V
Fast speed	7.8 V
Direction change	2 V

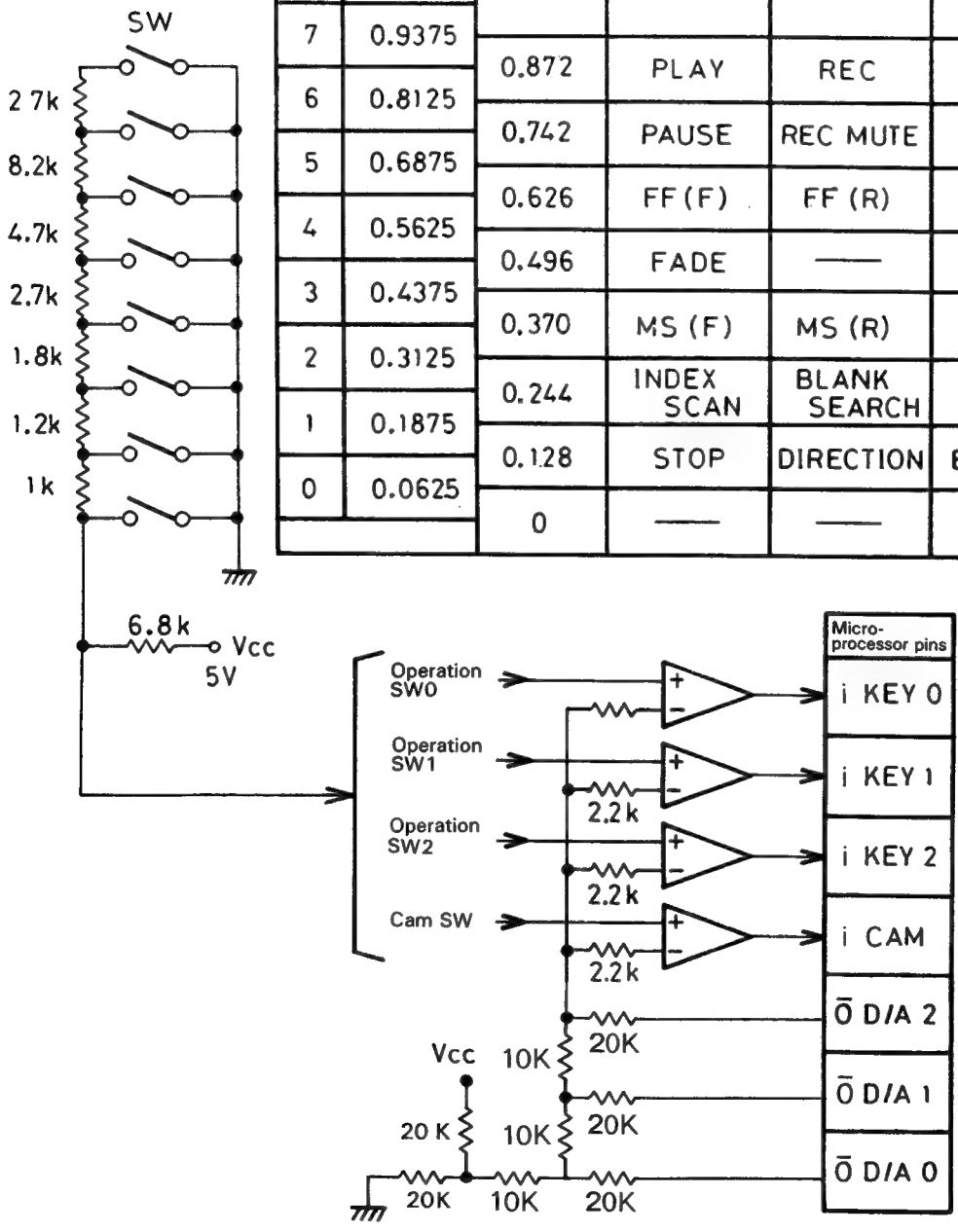
Table 3 Reel motor voltages

With complementary Darlington connection, Q507 and Q509 are equivalent to a big H_{FE} NPN transistor. The base voltage of Q509 is divided by R586 and R583 and becomes low because pin (6) (PLAY) of the mechanism control microprocessor is normally L. The 10 V power supply voltage is supplied to the base of Q509 at pin (6) (PLAY) is H (OPEN) when the tape is running at fast speed. With this, the power supply to pin (6) of IC507 is switched between when running the tape at fast speed and at other times and the reel motor voltages shown in Table 3 are obtained. The "direction change" 2 V shown in Table 3 is concerned with the mechanism operation in the DD-VR77. The pinch roller comes into contact with the capstan momentarily when the direction change signal is given even in the stop and pause modes and it causes the tape to become slack. In order to eliminate this, the reel motor rotates only when the pinch roller comes into contact with the capstan (playback position) even when the direction change signal is given and the tape fed by the capstan/pinch roller is wound onto the reel. By decreasing the voltage, the tape is wound with less tension; if the reel motor was rotating more rapidly, more tape than necessary would be wound. No detection is performed to determine the direction change signal; Q511 is turned On and the base voltage of Q509 is decreased further when the cam motor rotates.

VI Operation Key Input

Compared with the DD-VR77, there are more multi-editor keys in the operation section but the total number of keys is the same. Whereas the SCAN(F), SCAN(B) I.SCAN and B.SEARCH keys were independent in the DD-VR7, a SCAN key is provided in the new model and this is pressed together with the FF, REW, PLAY and PAUSE keys so that exclusive keys are not required. Since only the FADE multi-editor key can be pressed together with the EDIT key, this key is set to the vacant voltage between FF and MS(F) and the other B.SKIP, SCAN, EDIT(B) and EDIT(F) keys are installed with key matrix 2 which is separate from the previous key matrix 0 and key matrix 1. The reverse mode input previously transmitted after A/D conversion is now transmitted to the exclusive REV.M0 and REV.M1 input terminals which frees one A/D conversion circuit which is used for A/D conversion of the key 2 input. The A/D voltage levels of the operation keys is shown in Fig. 6.

	Ratio of D/A output	Ratio of key voltage	Operation SW0	Operation SW1	Operation SW2	Cam SW
	1.000	1.000	——	——	——	——
7	0.9375					
		0.872	PLAY	REC	B.SKIP	DIRECTION
6	0.8125					
		0.742	PAUSE	REC MUTE	SCAN	FOR PLAY
5	0.6875					
		0.626	FF (F)	FF (R)	EDIT (B)	FOR PAUSE
4	0.5625					
		0.496	FADE	——	——	FF
3	0.4375					
		0.370	MS (F)	MS (R)	——	STOP
2	0.3125					
		0.244	INDEX SCAN	BLANK SEARCH	——	MS
1	0.1875					
		0.128	STOP	DIRECTION	EDIT (F)	REV.PAUSE
0	0.0625					
		0	——	——	——	REV. PLAY



This is the comparison configuration of the 3-bit microprocessor output signal D/A converted with a resistor ladder and the analog signal the level of which is varied by switching. By checking the results of comparison of the 3-bit data in succession, the analog signal is A/D converted and the switch pressed is detected.

Fig. 6 A/D Voltage Levels Corresponding to Operation Keys and Cam Switch

MS(F), MS(R), I.SCAN and B.SEARCH accept conventional inputs so that remote control unit R70E can be used for all operations except multi-editor operation.
Previously and NMOS microprocessor was used for D/A conversion and the R-2 R resistor ladder (R521—R528) was driven by CMOS inverter 4069UB; with the new CMOS microprocessor, the R-2 R resistor ladder is driven directly. A CMOS microprocessor is used by pull-up resistors R529—R531; this compensates the resistance of the +5 V side FET of the internal output terminal because it is high.

VII Cam Switch and Configuration

Since the DD-VR77 can play back tape in the reverse direction in the EDIT(BACK) mode, a new mode in which the pinch roller can make contact with the capstan while rotating in reverse without changing the head direction is required. However, with the cam configuration of the DD-VR7, there is no space to install the head direction switch in the cam and cam switch.
Previously there were two direction podion, one for quick reverse and another for direction change; now there is only one for quick reverse and SCAN, FF and STOP which were previously provided separately for the forward and reverse directions are now in common positions which has made possible the new cam design shown in Fig. 7.

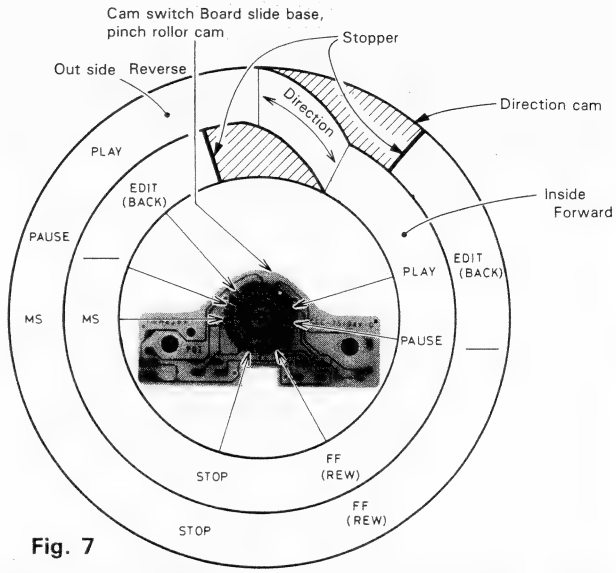


Fig. 7
DD-VR77 Cam Switch Pattern During Mechanism Modes

The conventional direction cam is shown in Fig. 8. With the new direction cam, the forward and reverse sections of the cam are separate with the double construction of the cam as shown in Fig. 7. Whereas 5 positions are used in common for the forward and reverse directions with the cam shown in Fig. 8, 8 positions are used with the new cam. By using this cam interlocked with the head direction switch and the pinch roller slide base drive cam interlocked with the cam switch, operation of all mechanism modes including reverse playback have been made possible.
Since the SCAN, FF and STOP mechanism modes are performed in common for the forward and reverse directions and the direction switch is provided in only one position, the position angle corresponding to the modes of the pinch roller slide base drive cam are increased from 10° in previous models to 14° in the DD-VR77, making the mechanism mode positioning highly stable.
Although many improvements have been made, there are certain inconveniences. For example, because there is only one change direction poition of the direction cam for quick reverse while the quick reverse time is as short as in the previous model, when the direction key is pressed in modes other than PLAY, the pinch roller hits the capstan during the direction change operation. This happens in forward and reverse play and, at this time, the tape is pulled out slightly which can result in its getting tangled round the capstan. To solve these problems, when the direction key is pressed, the reel motor rotates slightly so that slack tape is taken up by the capstan as described in the section "Reel motor drive circuit". At this time, if the normal reel motor voltage is applied, the amount taken up would be too great, so a reduced reel voltage is used.
As well as this, when the cam motor is rotated in reverse by pressing the direction key again during the direction change operation, the time the cam motor rotates is comparatively long (approx. twice that in previous models).

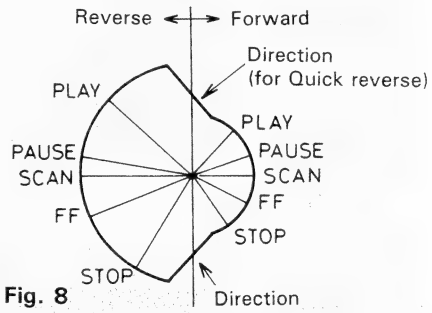
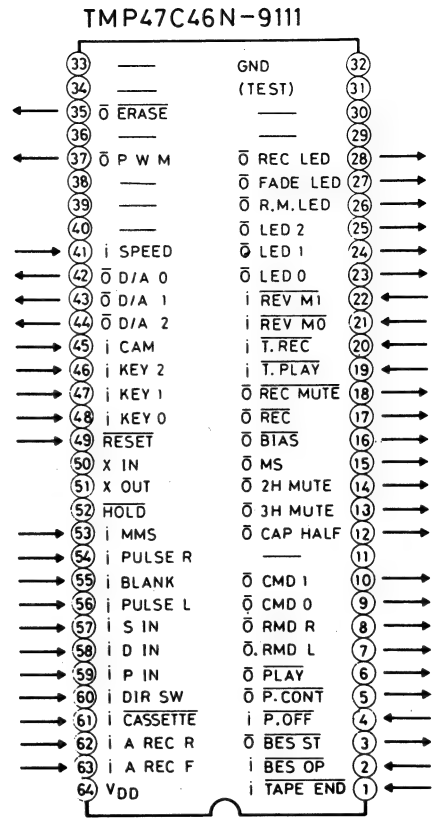


Fig. 8
Direction Cam and Mechanism Mode for DD-VR7

If the motor turns in reverse and the cam switch is rotated at this time, the cam switch position is detected incorrectly so the direction key input is not accepted during the direction change operation; it is only accepted after the direction change is completed. In addition, as you will understand by comparing Figs. 7 and 8, forward and reverse EDIT (BACK) are not linked with the new cam. That is, the direction cam cannot be rotated continuously; this is the major difference. When the cam motor is rotated continuously for any reason (i.e. when the cam switch wire is broken), because the cam switch signal cannot be detected, the direction lever touching the direction cam hits the stopper wall (refer to Fig. 7) and is stopped forcibly. At this time, since the cam motor is locked and a large force would be applied to the cam, for safety, it is prevented by the cam motor being rotated in reverse by the microprocessor if the designated cam switch signal is not obtained even when the cam motor is rotated for 2 seconds with power supplied. This operation can be confirmed when the mechanism key is pressed with the cam switch wire (CN503) removed

VIII Mechanism Control Microprocessor

In addition to the above new functions, the DD-VR77 has a mechanism control microprocessor with the following functions. The program area of the microprocessor in the DD-VR77 is about twice the area available in other models at 4 kbytes (4k × 8 bits) and the number of I/O terminals is increased with its 64-pin package. CMOS construction permits high-speed processing and low power consumption. CMOS construction has a number of advantages; a CMOS inverter is not needed in the D/A conversion circuit and its power consumption is 1/20 of that of a NMOS unit. On the other hand, it cannot drive the LEDs directly, so a separate IC503 is required.



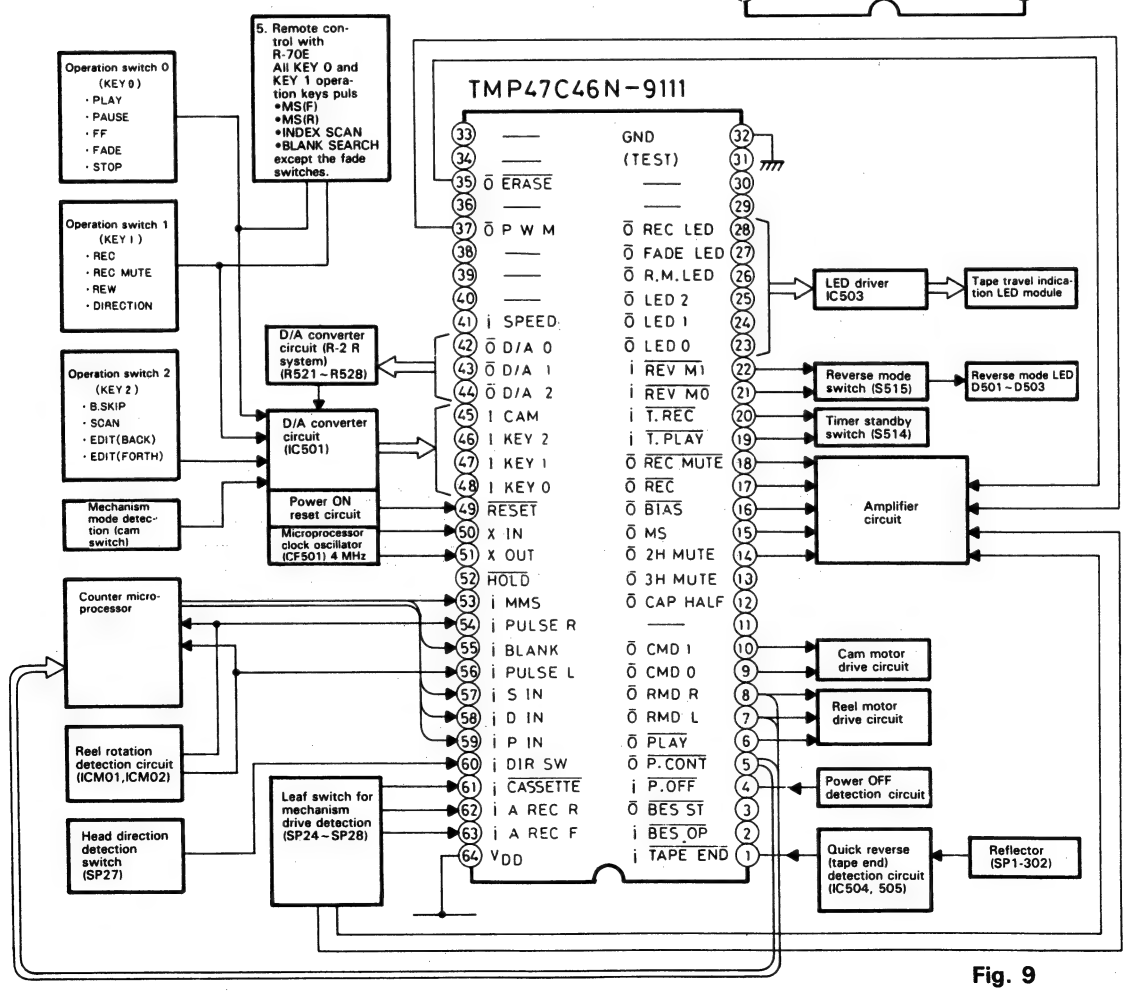


Fig. 9

Functions of pins of mechanism control microprocessor TMP47C67N-9111 (1)

Pin No.	*1 i/$\overline{O}$		Difference from previous model		Function
			*2	Equivalent pin in previous model	
1	i	T.END	Δ	T.END	Quick reverse (tape end) detection circuit input pin (tape end is judged when L last for 160 ms)
2	i	$\overline{\text{BES.OP}}$	○	$\overline{\text{BES.OP}}$	BEST signal input; timer recording input
3	$\overline{O}$	$\overline{\text{BES.ST}}$	○	BSTS	BEST signal output (not used)
4	i	$\overline{\text{P.OFF}}$	Δ	P.OFF	Power OFF detection signal input. The deck stops operation with L input and no further operation is possible.
5	$\overline{O}$	$\overline{\text{P.CONT}}$	□	PLAY	Connected to $\overline{\text{PLAY}}$ input of counter microprocessor. H in fast-forward, rewind and edit modes, L in other modes.
6	$\overline{O}$	$\overline{\text{PLAY}}$	□	PLAY	Reel motor voltage control pin. H with motor at high speed, L otherwise.
7	$\overline{O}$	RMDL	Δ	RMDL	] Reel motor direction control output.
8	$\overline{O}$	RMDR	Δ	RMDL	
9	$\overline{O}$	CMDϕ	○	CMDϕ	] Cam motor control pin.
10	$\overline{O}$	CMD1	○	CMD1	] Mechanism mode detection is performed by head direction switch and cam switch. The cam motor is controlled from the results of mechanism mode detection.
11		———			
12	$\overline{O}$	$\overline{\text{CAP.HALF}}$	×		L during edit operation at half speed which changes the speed of the DD capstan motor.
13	$\overline{O}$	3H.MUTE	○	3H MUT	H to mute output of 3-head deck (not used).
14	$\overline{O}$	2H.MUTE	○	2H MUT	Line out muting of 2-head deck.
15	$\overline{O}$	MS	Δ	$\overline{\text{MS}}$	H output during MS operation (including INDEX SCAN, BLANK SEARCH and BLANK SKIP) setting the playback EQ to 120 us and changing the characteristics of the MS circuit.
16	$\overline{O}$	$\overline{\text{BIAS}}$	○	$\overline{\text{OBIAS}}$	Output control pin of bias oscillator (master oscillator, erase oscillator) in recording. L when operating.
17	$\overline{O}$	$\overline{\text{REC}}$	○	$\overline{\text{OREC}}$	REC/PLAY selection output of Amplifier. L during recording.
18	$\overline{O}$	$\overline{\text{REC.MUTE}}$	○	$\overline{\text{ORMT}}$	REC MUTE control output pin. L when deck is in rec-mute mode.
19	i	$\overline{\text{T.PLAY}}$	×		Timer PLAY input pin. (L during timer play.)] Timer is OFF with both pins H.
20	i	$\overline{\text{T.RECϕ}}$	×		Timer REC input pin. (L during timer REC.)] Timer set to REC when both pins are L.
21	i	$\overline{\text{REV.Mϕ}}$	×		] Reverse mode input pin.
22	i	$\overline{\text{REV.M1}}$	×		] L during ⊃ mode / L during ⊂⊃ mode] The ⇄ mode is selected when both pins are H. / The ⊂⊃ mode is selected when both pins are L.
23	$\overline{O}$	LEDϕ	□	$\overline{\text{LEDϕ}}$	] Tape travel indication LED control pins.
24	$\overline{O}$	LED1	□	$\overline{\text{LED2}}$	
25	$\overline{O}$	LED2	□	$\overline{\text{LED1}}$	
26	$\overline{O}$	R.M.LED	□	$\overline{\text{RMTL}}$	REC MUTE LED control pin
27	$\overline{O}$	FADE LED	×		FADE LED control pin
28	$\overline{O}$	REC.LED	□	$\overline{\text{OREC}}$	REC LED control pin
29		———			
30		———			
31		(TEST)			Not used. Connected to GND.
32		GND			Power GND.

*1 i indicates input pin.
$\overline{O}$ indicates output pin.

*2 ○ ..... Pin function is same as in previous model.
Δ ..... Only logic level is reverse from previous model.
□ ..... Some changes from previous model.
× ..... New pin.

The previous microprocessor is the LM6402H-139 used in the DD-V7, DD-V9, DD-VR7, KD-V6 and DD-VR9.

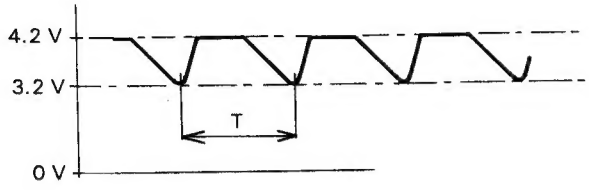
Functions of pins of mechanism control microprocessor TMP47C67N-9111 (2)

Pin No.	*1 i/$\overline{O}$		Difference from previous model		Function
			*2	Equivalent pin in previous model	
64		V_{DD}	○	V_{CC}	Power supply: +5 V (operates from approx. 2 V)
63	i	A.REC.F	×		Detects the erase prevention tab (forward). Recording not possible with H.
62	i	A.REC.R	×		Detects the erase prevention tab (reverse). Recording not possible with H.
61	i	$\overline{\text{CASSETTE}}$	□	P OFF	With cassette loaded "L", no operation other than direction change possible when H.
60	i	DIR SW	○	DIR SW	Detects the direction of rec/play head. (H, forward; L, reverse).
59	i	PIN	○	P OUT	] Inputs P OUT and S OUT signals from counter microprocessor.
58	i	DIN	○	D OUT	] Next operation determined by combination of these signals and mechanism
57	i	S IN	○	S OUT	] mode to be entered. (During memory operation)
56	i	PULSE L	□	SUP	Left reel drive pulse input.
55	i	BLANK	○	BLANK	Blank detection output (during blank search) input pin from counter microprocessor.
54	i	PULSE R	×		Right reel drive pulse input.
53	i	MMS	○	$\overline{\text{OMMS}}$	Non-recorded section input from microprocessor in MS operation. (H: tune or count-down, L: non-recorded section between tunes).
52		$\overline{\text{(HOLD)}}$			Not used.
51		X OUT	○	CLI	] Clock circuit in microprocessor. (Clock: 4 MHz)
50		X IN	○	CLϕ	
49		$\overline{\text{RESET}}$	○	$\overline{\text{RST}}$	Microprocessor reset pin. (Goes L when power is switched ON).
48	i	KEYϕ	○	KEY1	Input of PLAY, PAUSE, FF, FADE, MS(F), INDEX SCAN and STOP keys after A/D conversion.
47	i	KEY1	○	KEY2	Input of REC, REC MOTE, REW, MS(F), BLANK SEARCH and DIRECTION keys after A/D conversion.
46	i	KEY2	×		Input of B. SKIP, SCAN, EDIT(B) and EDIT(F) keys after A/D conversion.
45	i	CAM	△	CAM SW	Input of mechanism mode (cam switch) signal after A/D conversion.
44	$\overline{O}$	D/A2	△	D/A3	] Controls 3-bit R-2 R A/D conversion via R521—R528.
43	$\overline{O}$	D/A1	△	D/A2	
42	$\overline{O}$	D/Aϕ	△	D/A1	
41	i	SPEED	×		Half-speed input during edit (H: half-speed editing, L: normal-speed editing)
40		———			
39		———			
38		———			
37	$\overline{O}$	P.W.M	×		Output of electronic volume control during auto fade-in and fade-out and PWM erase oscillator control circuit during editing fade.
36		———			
35	$\overline{O}$	$\overline{\text{ERASE}}$	×		Output to control erase oscillator and master oscillator during editing fade and editing cut (L during editing fade and cut).
34		———			
33		———			

IX Waveforms at Each Pin

1. IC502

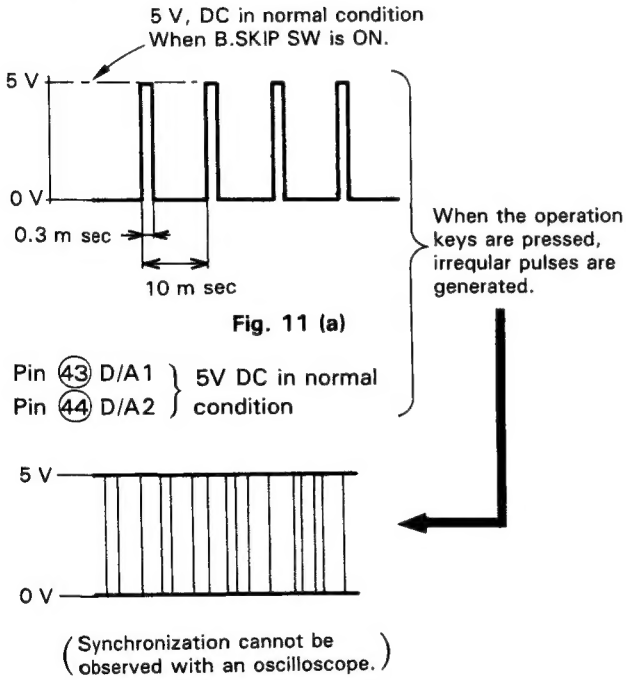
Pin ④ $\overline{\text{P OFF}}$



T: 10 ms (50 Hz areas)
8.3 ms (60 Hz areas)

Fig. 10

Pin ㊷ D/A



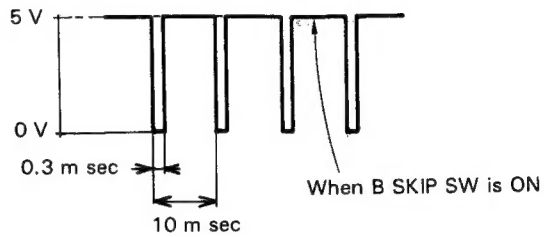
(Synchronization cannot be observed with an oscilloscope.)

Fig. 11 (b)

Pin ㊺ CAM 0 V DC in normal condition

(When the mechanism mode is changed, the waveform will be as shown in Fig. 11 (b).)

Pin ㊻ KEY 2 5 V DC in normal condition



(When KEY 2 is pressed, the waveform will be as shown in Fig. 11 (b).)

Fig. 12

Pin ㊼ KEY 1
Pin ㊽ KEY 2
} 5 V DC in normal condition.

(When KEY1 and/or KEY2 is pressed, the waveform will be as shown in Fig. 24 (b).)

Pin ㊿ X IN
Pin (51) X OUT
} 4 MHz oscillator

2. IC501

Pins ④, ⑥, ⑧, ⑩ D/A conversion circuit output.

4.8 V DC in normal condition.

When the STOP key is held pressed, the staircase waveform shown below is generated.

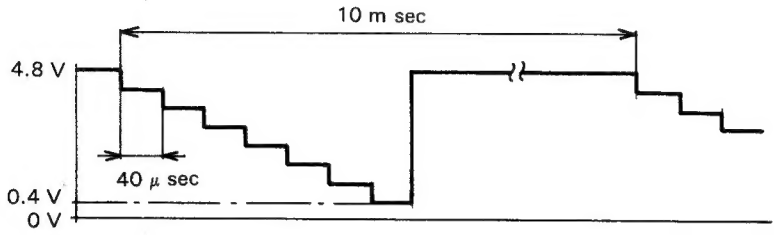


Fig. 13

Waveform produced in modes other than STOP, however its shape will be different (maximum 8 steps).

Waveform is different when B.SKIP/SCAN/EDIT(B)/EDIT(F) and other keys are pressed.
For example, when EDIT(F) key is pressed, the staircase waveform is as shown in Fig. 14.

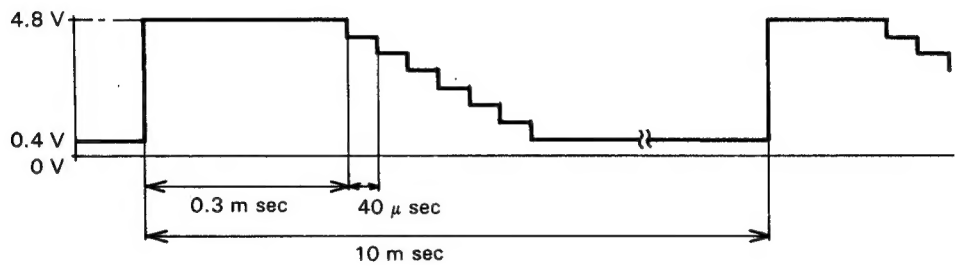


Fig. 14

Packing

Positions of controls and switch knobs at renewed packing

Power switch	: OFF
Timer stand-by switch	: OFF
MPX, NR switch	: OFF
Reverse mode switch	: ⇄
Output level control	: MAX
Input level control	: MIN
Input level balance	: Center
Mecha mode indicator	: ⩥
Operation button	: OFF

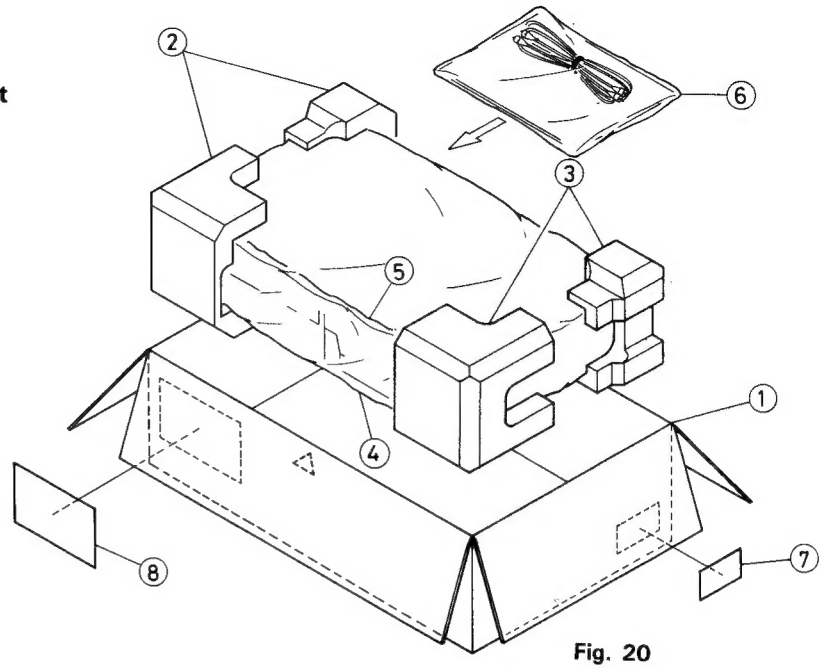


Fig. 20

Packing Parts List

⚠ parts are safety assurance parts.
When replacing those parts, make sure to use the specified one.

⚠	Ref. No.	Parts No.	Parts Name	Remarks	Q'ty
	1	VPD2137-002	Carton	DD-VR77 B	1
		" -003	"	DD-VR77 A	1
		" -004	"	DD-VR77 C	1
		" -005	"	DD-VR77 E	1
		" -006	"	DD-VR77 J	1
		" -007	"	DD-VR77 U	1
	2	VPH3125-001	Cushion	Left side	1
	3	VPH3126-001	"	Right R	1
	4	VPE3005-026	Poly Bag	for Unit	1
	5	VPK4002-006	Sheet	for Unit	1
	6	VPE3005-007	Poly Bag	for Inst. Book	1
	7	VPZ4001-001	Serial Ticket		1
	8	E66416-003	Envelope	DD-VR77 J/U (PX,EES) for Warranty Card	1

Dimension

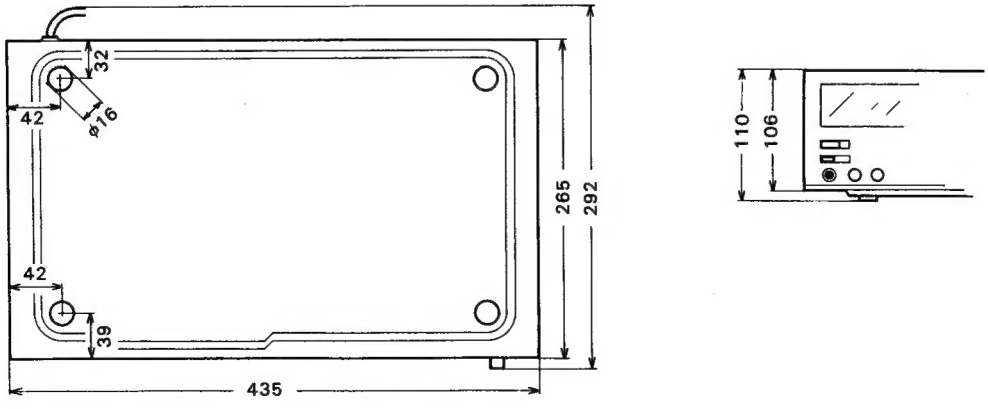


Fig. 21

Accessories

⚠ parts are safety assurance parts.
When replacing those parts, make sure to use the specified one.

⚠	Ref. No.	Parts No.	Parts Name	Remarks	Q'ty
		VMP0039-00A	Pin Cord Ass'y		1
		VNN0161-301	Instruction Book	DD-VR77 B/E	1
		VNN0161-901	〃	DD-VR77 A/C/J/U	1
		BT20060	Guaranty Certificate	DD-VR77 B	1
		BT20066	〃	DD-VR77 B/E	1
		BT20029C	Warranty Card	DD-VR77 A	1
		BT20025H	〃	DD-VR77 C	1
		BT20064	〃	DD-VR77 E	1
		BT20047B	〃	DD-VR77 J/U	1
		BT20071A	SVC Center List	DD-VR77 C	1
		BT20046B	Special Reply Card	DD-VR77 J/U	1
		BT20044D	Safety Inst.	DD-VR77 J	1
		QZL1002-003	Warning Label	DD-VR77 B (power cord)	1
		VNC1200-002	Copy Right Low Warning	DD-VR77 C	1
		VNC5311-203	Caution Card	DD-VR77 U (for EES)	1
		VNC5311-204	〃	DD-VR77 U (for PX)	1
		V04062-001	Siemens Plug	DD-VR77 U	1

JVC
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